FEBRUARY 1961

THE PAPER INDUSTRY

TAPPI

APPA

1961

NEW YORK

PAPER WEEK

FEBRUARY 19-23

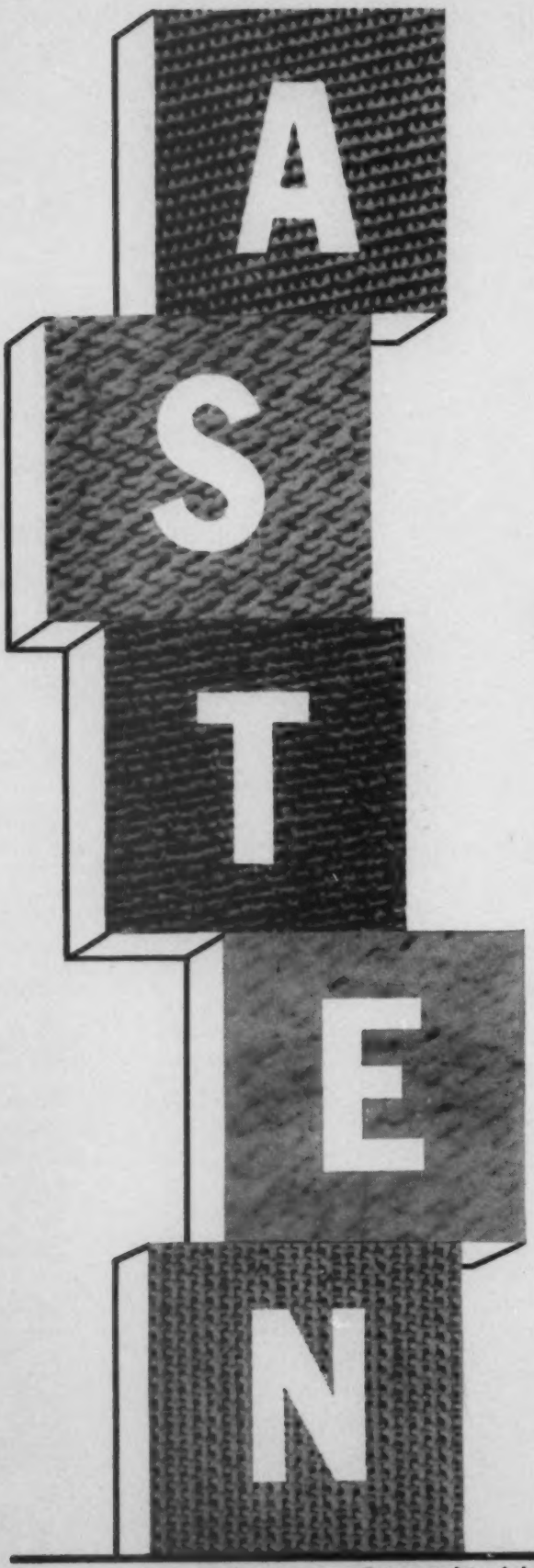
Coating pigments

1961 – production of pulp and paper

Tappi conference program

Odor removal improves public relations

Publishers of PAPER AND PULP MILL CATALOGUE



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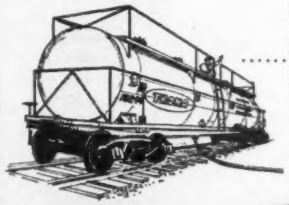

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Upson Company saved installation costs first year

CURTISS WRIGHT BETA GAUGE Provides continuous precise measurements of basis weights

...improves quality

Mr. Henry W. Schmidt, *Vice President, Manufacturing, of the Upson Company, Lockport, New York,* states:

"Our gauge has proved most beneficial from the economic standpoint . . . has definitely improved the quality of all our products. Here at last . . . the answer to many of our problems."

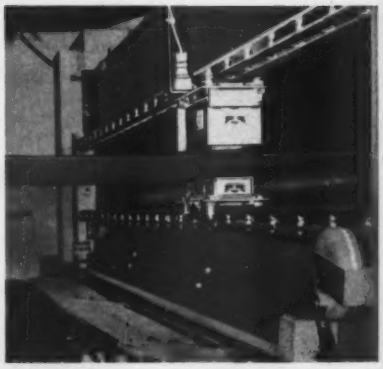
The Upson Company, manufacturers of world-famous Upson Board, claims the Curtiss-Wright Beta Gauge saved its installation cost during the first year of operation.

The use of this Beta Gauge by Upson has resulted in better product quality and has improved production 3 ways:

1. Changeover time from one type of sheet to another was cut in half.
2. Uniformity at start-up reduced scrap —increased production.
3. The more uniform product allowed effective automatic control; permitted an increase in machine speed without increasing dryer capacity or steam requirements.

Closer tolerances and higher quality are now possible because Beta Gauge scans at phenomenal speeds, does not touch the material inspected and makes a substantial contribution to the maintenance of the correct basis weight of the finished product. Thus, finding and correcting one variable, or as many as 100, is now made in a matter of minutes instead of previous methods that sometimes took hours.

For additional information phone SWinburne 9-0500 or write:



Beta Gauge, mounted on an "O" Frame, is shown in operation at the Upson Company. By means of radioactive isotopes, it measures basis weight, without contact, at the wet end of the board machine. No radioactivity remains on the sheet. Beta Gauge permits optimum control of variables during actual production.

Princeton Division **CURTISS WRIGHT** CORPORATION Princeton, New Jersey

In CANADA: Canadian Curtiss-Wright Ltd. • 43 Westminster Avenue, North • Montreal 28, P. Q., Canada

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The Paper Industry

Technology • Engineering • Management • Production

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from our point of view

Are we sufficiently concerned about American-Canadian relations?

R. M. Fowler, president of the Canadian Pulp & Paper Association, has an uncanny sense of recognizing trouble-spots that require immediate attention — irrespective of whether these touch on problems involving the economy, industrial management, or international relations.

It was therefore no mere coincidence that, at the Annual Luncheon of the Canadian Pulp & Paper Association, Mr. Fowler viewed with concern the deterioration of relations between Canada and the United States as one of the most important problems facing both nations. His concern was not so much with the inherent differences of policy and the accompanying disagreements and frictions that normally fit into the behavior-pattern of two nations facing each other across an extensive border line, as with the resentment voiced against the excessive control of Canadian industry by American interests.

This resentment, according to Mr. Fowler, is spurred by excessive nationalism and sensitivity toward American investments, on the one hand, and by the failure of some American subsidiaries to become part of the Canadian economy and to identify themselves more closely with the technology, local interests, and aspirations of the Canadian people, on the other hand.

It serves little purpose for us to dwell on the pros and cons of American investments in Canada or on the problem arising from excessive sensitivity and nationalism voiced by some segments of the Canadian people. This is a Canadian problem and was expertly handled and diagnosed by Mr. Fowler. It may, however, be of some advantage to focus on the resentment arising from the failure of some American subsidiaries to identify themselves more closely with the Canadian way of life.

We should like to assume that both nations are sufficiently mature to recognize their differences in background in so far as these concern questions of economy, state, and politics — so that complete conformity of behavior cannot be expected from one or the other.

Each country has a different role to play. To be different, to dissent and to challenge a system of ideas usually means a greater contribution to civilization than does an unquestioning adjustment to the pressures of conformity which, at best, condemns a civilization to the dullness of a status quo.

Our inherent differences have not prevented us in the past from implementing both privileges and responsibilities associated with a good neighbor policy. These differences will not stand in our way of resuming the friendly relations that are the underlying basis of this policy. Both countries will have to make a special effort to eliminate the causes for the petty mistakes and irritations that have led to a deterioration of relations. We as a people, certainly should make an effort to thoroughly familiarize ourselves with the geography and the national characteristics of our great northern neighbor and recognize the unique role Canada will continue to play on the international scale. American subsidiaries in Canada, in turn, should make every effort to identify themselves more fully with the Canadian economy and the Canadian way of life.

A. W. J. Dyck

Another Mount Vernon Dryer Felt Success Story...
A machine producing fine papers has repeatedly used a smooth-faced, all-cotton dryer felt recommended and supplied by Mount Vernon Mills. SIAMESE 135 has averaged over the years 360 to 400 days operating life, giving continual complete satisfaction. Where high absorbency and an exceptionally smooth face are required, SIAMESE 135 is a recognized leader.
135

HIGH IN POROSITY

SIAMESE 135—All Cotton Duplex Dryer Felt

SIAMESE 135 provides the answer to three problems simultaneously. Available in medium and heavy weights, this all cotton duplex dryer felt fills the need for a low-cost felt with maximum *porosity*, efficient *drying*, and an exceptionally *smooth surface*. SIAMESE 135 can, therefore, chalk up on the credit side . . . smooth finish, optimum drying, and savings! Ask for this dependable dryer felt with these 3-way, built-in benefits. Available pre-stretched and pre-shrunk with clipper seams.

MOUNT VERNON DRYER FELT FAMILY—SIAMESE 135 is just one of Mount Vernon's full "family" of scientifically designed dryer felts. There's an individual felt for virtually every paper machine position and every paper-making need.

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mind your own business

A personal file of stimulating ideas, little-known facts and daily problem solvers.

When you goof

Everybody makes mistakes, but some of us are tiresomely long-winded in explaining them away. Here is a letter that does its job and, for some reason, arouses enough good-natured interest to be shown around by those who have occasion to get it:

Dear Mr. Smith
You're right.
We're wrong.
We're sorry.
Sincerely yours. . .

Key to persuasion

Next time you have to "sell" somebody on an idea, remember: spotlight the benefits.

Why?

Because people don't "buy" an idea. They buy what an idea will do for them. They buy enjoyment, satisfaction, pleasure, solutions to problems, advantages—in short, benefits. People never accept an idea just because it is new or "different." They always accept it for what it will do for them. It's their only incentive for changing their opinions, beliefs and actions.

Want your boss to install a new billing machine? Don't describe the operation of a slick, new gadget. Do explain how it will eliminate errors, speed up invoicing, boost profits.

Want an employee to be more careful about using his safety equipment? Don't tell him what an injured worker costs your firm. Do explain the injuries he may sustain if he continues his neglect.

A reminder: People are most interested in profits (money, time, energy), safety, prestige and approval. Put your ideas in terms of any of these basic areas of self-interest and watch your powers of persuasion grow!

A famous businessman's $25,000 secret

Charles Schwab, one of the first presidents of Bethlehem Steel Co., once told efficiency expert Ivy Lee: "If you can give us something to pep us up to do the things we know we ought to do, I'll gladly pay you anything within reason you ask".

"Fine", answered Lee. "I can give you something in twenty minutes that will step up your 'doing' by at least 50 per cent".

"Okay", said Schwab. "Let's have it".

Lee handed Schwab a blank sheet of note paper and said: "Write down the six most important tasks you have to do tomorrow and number them in the order of their importance. Now, put this paper in your pocket and the first thing tomorrow morning look at item one and start working on it until it is finished. Then tackle item two in the same way; then item three and so on. Do this until quitting time. Don't be concerned if you have only finished one or two. You'll be working on the most important ones. The others can wait. If you can't finish them all by this method, you couldn't have with any other method either; and without some system, you'd probably not even have decided which was the most important.

"Do this every working day. After you've convinced yourself of the value of this system, have your men try it. Try it as long as you wish and then send me a check for what you think it is worth".

A few weeks later Schwab sent Lee a check for $25,000 with a letter saying the lesson was the most profitable he had ever learned. In five years, this plan was largely responsible for turning the unknown Bethlehem Steel Co. into the biggest independent steel producer in the world. And it helped to make Charles Schwab a hundred million dollars and the best-known steel man in the world.

What worked for Schwab can work for you. Try it! It may revolutionize your life.

Energy boosters

The "gift" of abnormal energy that some people seem to have is regarded longingly by others. Actually, health factors being equal, it is not a gift but a conscious (or unconscious) knack these men possess for stimulating normal supplies of energy into a rushing geyser. They increase personal productivity by developing attitudes and creating situations which quicken their energy supply. You can too, if you. . . .

• VARY YOUR TASKS. Always plugging at the same job saps energy. Varying your chores stimulates you, provides the change which rests your mind. Been juggling figures? Try filing for a while. On your feet for a long period of time? Switch to some desk work.

• MOTIVATE YOURSELF. Stick your neck out by announcing goals, before achievement, to people whose esteem you value. You'll surpass your own expectations because you've made a definite commitment.

• ASSOCIATE WITH ENTHUSIASTIC PEOPLE. Enthusiasm is contagious. By mixing with men who are excited about their work, you will "catch" their zestful spirit, be inspired to do your very best.

DICALITE® TECHNICAL REPORT

DICALITE DEPARTMENT • GREAT LAKES CARBON CORPORATION • 612 SO. FLOWER ST., LOS ANGELES 17, CALIFORNIA

New Dicalite BULK-AID TRADEMARK for Paper Products

Dicalite BULK-AID is a new development in inorganic fillers, with particle size range and distribution carefully controlled to give maximum bulking characteristics in paperboard and paper products. BULK-AID has the lowest apparent or bulk density of any known mineral filler for papermaking use, thus providing required caliper at lower weights. One example is that of a 40-point groundwood sheet whose weight was reduced from 29.2 lbs/ft³ to 27.3 lbs/ft³ by the addition of 10% BULK-AID.

The light weight and bulking characteristics of BULK-AID make it especially suitable for use in paperboard; its high brightness and excellent retention are also of considerable value. BULK-AID lowers the furnish cost and increases pulp mileage in top liners for patent white paperboards. Its brightness and opacity raise the quality of underliners at the same time it extends the furnish.

Dicalite BULK-AID is an amorphous mineral, technically an aluminum silicate, produced from a volcanic mineral known as perlite by a special process developed by Great Lakes Carbon Corporation. BULK-AID is inert, insoluble in water, acid or mild alkalies. It is grit-free, and exhibits no reaction with alum in sizing or with other papermaking chemicals. It is readily dispersed in any furnish, does not cause foam, and will not fill felts.

Among BULK-AID's physical characteristics are these:

Color: White
Average G.E. Brightness: 83

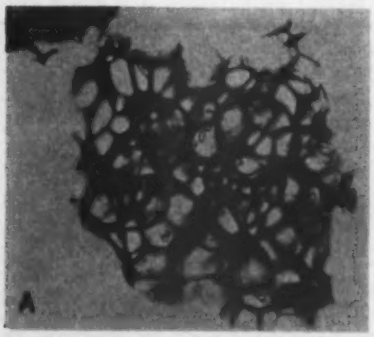
Loose weight: 4½ lbs/ft³ average

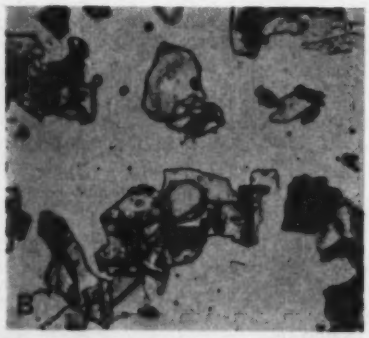
Bulk densities in paperboard: 15 lbs/ft³ average.

Particle size: 80% less than 10 microns

Extensive testing has shown BULK-AID to be successful in actual paper mill production. Most of these tests were on cylinder machines for paperboard production, but limited tests indicate its value in many slow speed fourdrinier applications.

Your Dicalite engineer will be glad to discuss BULK-AID with you and to advise on possible product applications in your own plant.





When perlite is crushed and then suddenly heated to the proper point in its softening range, it pops like corn into particles like that shown in photomicrograph A, containing a myriad of microscopic sealed cells. The size of the original particle and the application of heat are both important, and are critically controlled. This is the expanded material from which BULK-AID is produced. Controlled milling and air classification by an exclusive Great Lakes Carbon Process are the major steps in making BULK-AID, typical particles of which are shown in photomicrograph B.

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Gordon G. Halvorsen

DICALITE'S "MAN ON THE SPOT"

The development of Bulk-Aid, to meet the industry's need for an extremely low density bulking agent, was initiated by Gordon Halvorsen, Product Sales Manager for Dicalite, and he has been closely identified with its tests and product application work from the beginning.

Halvorsen has an extensive background in research and development work, beginning with his graduation from the University of Minnesota with a degree in Chemical Engineering. Prior to joining Great Lakes Carbon in 1940, Gordon had been engaged in technical and laboratory work in the pharmaceutical, corn processing and water treatment fields, and continued his research work in the Dicalite product laboratories for the first 5 years of his association.

Halvorsen is the author of several technical papers, and has contributed to both paper industry and brewing publications. Among his technical society memberships he lists TAPPI, American Society of Sugar Beet Technologists, Master Brewers Association of America, and others in the brewing and drycleaning fields.

NEW DATA SHEET

on Dicalite *BULK-AID* gives more complete information on physical and chemical properties, and on its advantages in papermaking. Write for your copy to Dicalite Dept., 612 So. Flower St., Los Angeles 17, Calif.

Uniformity

Uniformity

The uniformly good **PERFORMANCE** you want is built into your Albany felts . . . and it doesn't just happen.

Felts that produce more and last longer are the result of painstaking care in field engineering, design and manufacture and an unending application of experience and testing. . . .

A vital first step in the creation of productive and durable felts is taken when Albany Felt Sales and Service Engineers thoroughly familiarize themselves with your machines, production techniques and felt performance records.

Your requirements are then literally built into each Albany felt you order. Every possible scientific and human effort is put to work to make your Albany felt exactly to your specifications.

You can plan on performance . . . felt after felt after felt.

ALBANY FELT COMPANY
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Dedicated to Paper Industry Progress

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Cowansville, Quebec • Cuautitlan, Mexico

HOW DOES ALBANY FELT COMPANY ASSURE PAPERMAKERS OF FELT UNIFORMITY?

120 different checks assure *Uniformity*

The Closeness Testing Machine provides one of 120 specific checks made during the manufacturing process of every Albany felt. This mechanical test measures porosity by exerting a back pressure of air on the felt. This proves drainage qualities.

The porosity test takes place after manufacture *but the exacting and numerous details of uniformity and quality control begin way back:* with the selection and approval of the wools, the scouring, the preparing of the blends of wool, or wools and synthetics . . .

Take yarn making, for example. Some roping, which is spun into yarn, must not vary more than *one tenth of an ounce per mile!* Over 500 different varieties of yarn are used by the Albany Felt Company. Each yarn is checked frequently against prescribed specifications for weight, tensile strength and elasticity.

In the fulling process, during which the felt is reduced in size by as much as one half, numerous measurements are made to assure exact width and length.

This type of detailed felt testing continues *right through to your machine.* Check after check after check . . .

THE PAY-OFF:
IMPROVED FELT PERFORMANCE
—AND PROFITS—
AT YOUR MILL

TALK IT OVER WITH YOUR ALBANY FELT SALES ENGINEER

ALBANY FELT COMPANY
ALBANY, N.Y.
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Dedicated to Paper Industry Progr

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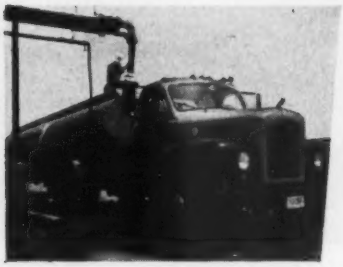
How will you have your alum?

. . . dry or liquid

. . . in bags, bulk, tank trucks or tank cars



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As America's primary producer of aluminum sulfate, General Chemical meets every industrial requirement for alum . . . provides every form . . . every strength . . . every package size. In addition, you're assured of fast, local service. General Chemical has twenty-nine plants in the United States and Canada* producing dry and liquid alum. These, plus a coast-to-coast network of warehouses for dry alum in every major center of commerce, assure dependable supply at all times.

For complete information about General Chemical alum and technical service available to alum users, write on your company letterhead for General's 30-page technical brochure, "Aluminum Sulfate."

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TGS

RAIL AND WATER SHIPMENTS

In order to better serve our far-flung customers in the process industries, we have developed at Beaumont, Texas the most modern Sulphur storage, handling and loading facilities in the world. This terminal and shipping center is now receiving deliveries from all four major TGS properties in Texas: Spindletop, Moss Bluff, Newgulf, and Fannett - the most recent mine to be developed.

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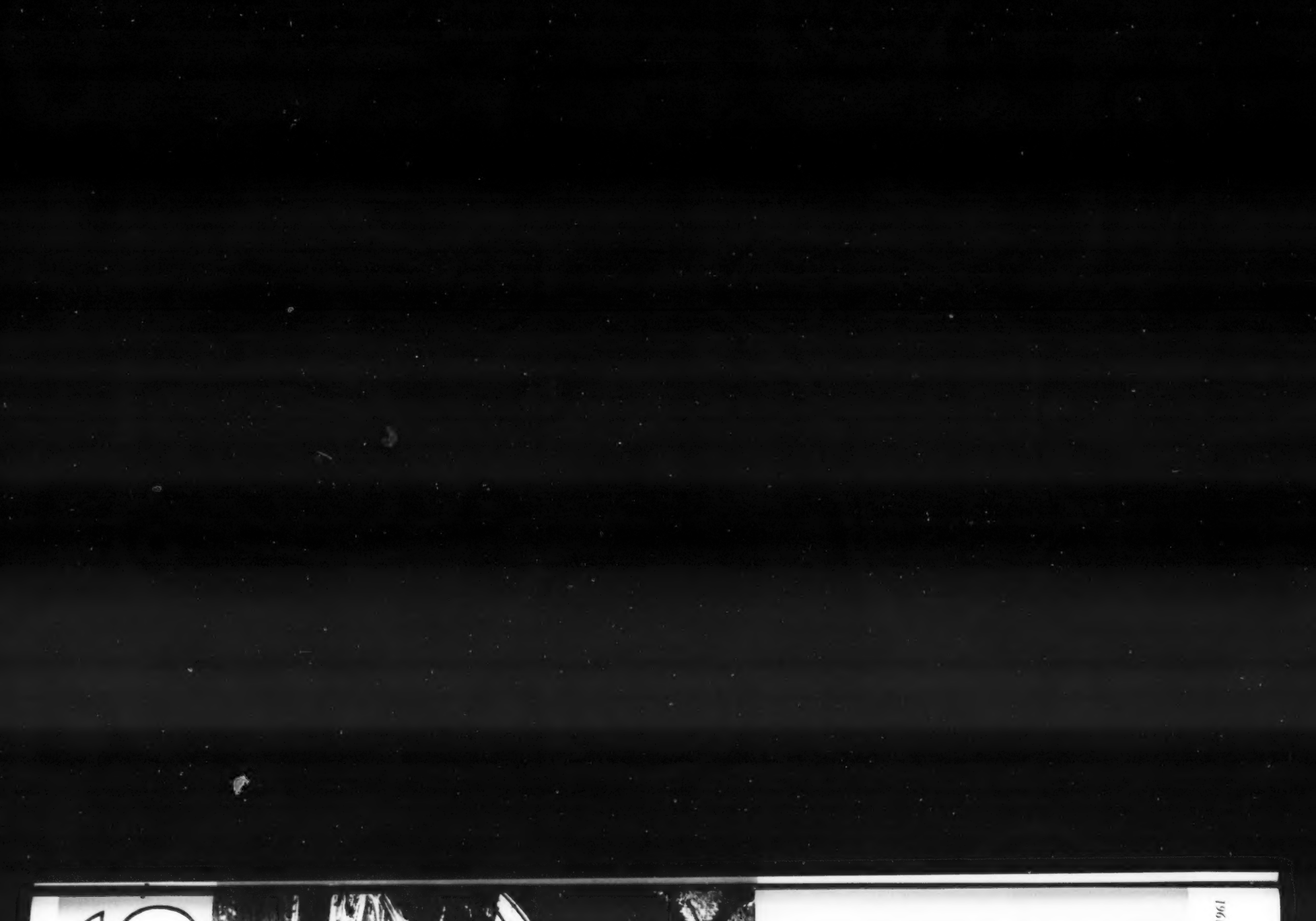
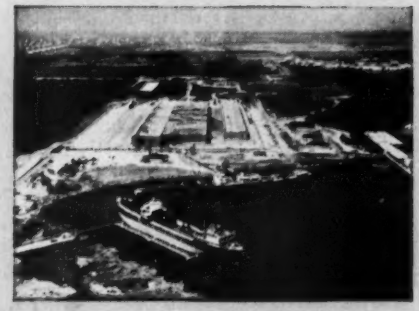


. . . is now operating at **Beaumont, Texas**



THE WORLD'S NEWEST SULPHUR TERMINAL

. . . for Solid Sulphur

. . . for Molten Sulphur

A few of the design features of this terminal may be of interest:

- **It receives, stores, and loads both solid and molten sulphur.**
- **It can load simultaneously 1 dry cargo ship of 20,000 tons capacity, 3 molten sulphur barges and 1 molten sulphur tanker. There's a holding dock where a second cargo ship can be tied up. The barge basin will accommodate 12 sulphur barges.**
- **Storage capacity totals 31,000 tons for molten sulphur and 1,000,000 tons for solid sulphur. Loading capacity for molten sulphur ranges up to 3,000 tons/hour, tanker and barge simultaneously; for solid sulphur the loading capacity is 1,200 tons/hour into ship or barge.**

This development at Beaumont is but another step in the broadening delivery service program now being carried out by TGS. Regional distribution centers, handling molten sulphur, are already in operation at Cincinnati, St. Louis and Tampa. Coinciding with the full operation of our main terminal at Beaumont will be the opening early in 1961 of two coastal terminals at Carteret, New Jersey, (26,000 tons molten sulphur storage) and Norfolk, Virginia (20,000 tons). Other terminals are in the planning stage.

TEXAS GULF SULPHUR COMPANY
75 East 45th Street, New York 17, N. Y.
811 Rusk Avenue, Houston 2, Texas
Sulphur Producing Units: **Newgulf, Texas • Spindletop, Texas Moss Bluff, Texas • Fannett, Texas • Worland, Wyoming • Okotoks, Alberta, Canada.**

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Rheology of paper coating

R. A. DIEHM
Professor of Paper Technology
Western Michigan University

Part II - Coating pigments

• *The ideal coating pigment imparts both covering power and brightness to the coating. Pigment properties that impart brightness, opacity and ink receptivity to the coating are discussed in this article.*

THE PAPER coater is well aware that the pigment or pigment mixture going into the coating mixture is an important factor in regulating the results obtained. An exploration of the various pigment properties relative to their influences upon the coating mixture should help the coating technician to understand better why they behave differently under various conditions.

Fundamentally, rheological subjects can be divided into molecular and colloidal systems. The line of demarkation is not very definite in the border area where a solution or dispersion may be colloidal or molecular. Sometimes an empirical division is used in which molecular solutions consist of particles or molecules of less than 10Å. dispersed in a continuous phase, colloidal solutions are molecules or particles of 10 to 10,000Å. dispersed in a continuous phase, and the system is a coarse aggregate if the particle size is larger than 10,000Å.

Paper coatings are of a colloidal nature in which the pigment particles exist as aggregates of molecules. They are suspended in water as the continuous phase. The type of dispersion obtained is dependent upon a third substance which has an affinity for both the particle and the continuous phase.

Colloidal particles have the property of associating with similar particles or with particles that have some features in common with them. They are drawn together by physical forces. Without this association, colloidal materials would not form films, plasticity, coagulates, gelatinous precipitates, or high viscosity.

Surface area of pigment particle

The amount and character of the surface area of the pigment particle is responsible for the effects obtained by its use in the paper coating. This is especially true in its influences on opacity, brightness and ink receptivity. When a pigment aggregate is divided into smaller units, the surface area increases as the diameter of the unit becomes smaller. For example, a cube with sides of one centimeter will have a surface area of 6 sq. cms. If this same cube were subdivided into cubes with sides of 10 Anstrom units, the total surface area would become 6,000 meters.

It is customary to work with specific surface when dealing with colloidal materials. It is the sum of all the surfaces of the particles in one gram of material, and is given in square meters. Since the specific surface varies inversely proportional to the first power of the diameter of the particle, the average particle size governs the magnitude of the surface. Measurements of 11 sq. m. for titanium dioxide, 5 sq. m. for zinc oxide, and 200 sq. m. for carbon black have been made. These values are given only for illustrative purposes, and it should be remembered that various commercial grades of the same pigment may show great variations in specific surface. The effects of the specific surface upon the coating characteristics will become obvious in this consideration.

Action at the interface

The area in the colloidal system where the particle and the suspending medium meet is known as the interface. The chemical and physical reactions occurring in the interface have been subjected to considerable study because they determine the rheological properties of the coating mixtures. If sorption is used to determine the accumulation of one or more substances in the interfacial layer, then chemical sorption and physical sorption must be recognized. The former involves strong chemical valence bonds while the latter is involved with strong physical forces, especially van der Waals forces.

The wetting of the particle is determined by the action at the interface. Complete wetting is obtained when the liquid spreads over the surface area of the solid, displacing all the adsorbed gases. Pigment particles exhibiting this characteristic will disperse very easily in liquid. When the liquid does not spread over the surface of the particle, but remains as a lens, there is no wetting of the particle and dispersion will be poor. The contact angle is used to determine the degree of wettability of the pigment.

Effects of pigment properties

The primary purpose of coating papers is to provide a smooth continuous surface that permits printing in greater fidelity than do uncoated papers. The pigment is responsible for these properties; the adhesive holds the pigments to each other and the surface of the paper. Special features of the coatings imparted by the pigments are brightness, opacity, and ink receptivity.

The ideal coating pigment imparts both covering power and brightness to the coating. The natural brightness of the pigment as well as its particle size determine how much brightness it will impart to the coating. The finer particles of some pigments are usually brighter than the coarser particles, but they also require more adhesive which can become a neutralizing effect if the adhesive has a dulling effect because of its inherent color. Pigment brightness is usually reduced as the particle size drops below 0.2 micron in diameter.

Hiding power of pigments is enhanced by smaller diameter particles and high refractive indices. The smaller the particle the greater is the probability of light striking its surface rather than passing through between particles. The opacity of the coating depends upon the refractive indices of the components of the coating, namely, pigment, adhesive, and air. If only pigment and air were present, the coating would have its greatest opacity, but since the pigment must be bound to the paper with adhesive which has a refractive index between that of the pigment and of the air, the opacity of the coating will decrease as the amount of adhesive is increased.

The particle size of the pigment must also be considered in developing the proper ink receptivity of the coated paper. It is quite generally accepted that the penetration of ink into the paper surface is governed by the flow of liquids through porous masses. Large particles will produce large voids and absorb ink fast in comparison to the small voids produced by small particles and the slower absorption. The total amount of ink absorbed is proportional to the void fraction of the surface of the paper.

Particle shapes

The shapes of some particles make it very difficult to ascribe defiinite sizes to them. The average particle size is an arbitrary measurement, depending upon what the investigator chooses to measure. The size is usually given as diameter, but what is the proper diameter when the particle is shaped irregularly? Diameters are given in microns.

It is comparatively easy to measure the diameter of a spherical particle. If the particle is a cube, does one use the face of a side, the diagonal of a face, or the diagonal of the cube? The same considerations come up in measuring the diameters of needles or parallepipeds. Only the specific surface and the number of particles per unit weight are objective and cannot be changed by definition.

The particle shape has much to do with the mechanical properties of the coated surface. Some will produce smoother surfaces than others, affecting the gloss very materially. Particle shape influences the outline of the void spaces while the particle size determines the size of the voids. The shape and size combined determine the ink receptivity of the coating.

There are an infinite number of particle shapes in the pigments used in paper coatings. These depend upon the perfection of original crystallization and upon the number of particle fractures during the milling operation. For simplicity, the shapes of particles are classed as isotropic, needles and plates. The isotropic are spheres, a rarity in coating pigments. The needle shape is given to all particles having a single long axis. Zinc oxide and some forms of clay are of this type. The plate is usually a flat particle without a single long axis. The normal coating clay is an example of the plate.

Particle sizes are measured by light and dark fields under the microscope, by ultraviolet light, by the electron microscope, and by the velocity of their movements through a suspending medium by the principles of Stoke's Law in which the forces are either gravity or centrifugal force.

Clay

Much has been written about the various pigments and their uses in the paper coating operation. In order to avoid needless repetition, this consideration will treat only certain rheological properties of the pigments used in coatings. A good pigment has free flowing characteristics to permit the preparation of high solids coating mixtures, good ink receptivity, high reflectance and brightness, good covering power, compatibility with many adhesives, easy calendering to a smooth surface, and low cost.

Clay is the most extensively used pigment in paper coatings. At one time it was practically the only pigment used not only because of the economical aspect, but because it improved the general appearance of the sheet along with the printability and the ink receptivity. As could be expected in the normal course of scientific development, specific demands put upon the performance of some coated papers made it necessary to use mixtures of pigments to satisfy all the requirements.

Whether clays are of primary or secondary origin when mined, they are processed to a point where they can be used interchangeably in some operations. In recent years, the particle size of coating clays has become smaller and smaller. Practical specifications of market clay call definite percentages of diameters less than 2 microns.

Anyone who has used different clays knows that there exist rather profound differences in rheological characteristics from one clay to another. The amount and type of salt content, the nature of the exchangeable ions, the particle size, and the species of mineral are considered some of the more important variables.

The ideal clay would be pure kaolinite, a hydrous aluminum silicate It is formed from feldspar by weathering. If the purity of coating clay is to be judged by its kaolinite content, then partially weathered feldspar, mica, iron oxides, manganese compounds, calcite, quartz, illite, Halloysite, and montmorillonite must be listed among the impurities. The latter is of very small particle size and not only increases the viscosity of the clay, but also alters its flow properties. It is believed that this material is quite widely present in coating clays.

As mentioned above, the clay particle has the shape of a plate, existing as stacks of plates as well as single plates. The larger particles are said to be composed of stacked plates or crystals while the individual plates are the finer particles in a coating clay.

The specific gravity of coating clay is between 2.57 and 2.63. Its refractive index is 1.56 which is quite similar to that of cellulose, but it increases opacity because its fine particles fill the interstices of the sheet to increase its density. Clays have been prepared with brightness values up to 95 per cent with most coating clays ranging between 86 to 89 per cent brightness.

When one considers small amounts of impurities in the kaolinite along with individual and stacks of kaolinite plates, it is not surprising that practically all types of flow can be encountered when working with various clays. With some clays it is easy to develop a plastic system while others develop dilatant systems quite readily. The degree of thixotropy or the thixotropic index shows considerable variation from clay to clay.

Calcium carbonate

Calcium carbonate pigments are known to the industry as calcite and aragonite, natural and precipitated respectively. In the case of the former, it is extremely necessary that the mineral as mined is in practically pure form. Since this is hardly possible to the extent of meeting the current needs of the coating industry, it has become necessary to prepare the calcium carbonate in a carefully controlled precipitated form. In all methods of making precipitated calcium carbonate the natural limestone is burned to calcium oxide and then dissolved in water to form milk of lime. The milk of lime may be transformed into the calcium carbonate form by carbonation with the kiln gas, by causticizing with sodium carbonate, or by converting to calcium chlordie with ammonium chloride and subsequent cauticizing of the purified calcium chloride solution with sodium carbonate.

These various steps in the manufacture of calcium carbonate are given because they influence the rheological properties of the precipitate. Control of particle size and shape is made possible through the regulation of the concentrations of chemicals, the temperature of the reactions, the time of the reactions, agitation rates, etc. This procedure has enabled the preparation of calcium carbonate pigments to act in specific manners to do specific jobs in the coating industry.

Consequently, there are available to the coating technician controlled particle sizes ranging from 0.03 to 5.0 microns average diameter. That these behave differently is shown in practical operation in which dull coatings are prepared from the largest particles while high finish coatings can be prepared from the smallest particles. The particle size also determines the opacity produced, increasing as the particles become smaller up to a certain point and then decreasing as the particle size gets into the range of the ultrafine particles. As the particle size increases, the ink receptivity decreases. As in the case of other pigments, the adhesive demand increases as the particle size decreases.

The viscosity of the calcium carbonate dispersion increases as the particle size becomes smaller. The degree of thixotropy increases as the particle size becomes smaller. There is a notable increase in the yield value of the carbonate plastic system as the number of ultrafine particles in the system increase.

Calcium carbonate pigments have brightness values from 93 to 98. The hexagonal cubes of calcite are doubly refractive, having indices of 1.658 and 1.486. The orthorhombic needles or rods of the precipitated forms have a refractive index of 1.66. The specific gravity ranges from 2.6 to 2.8.

Titanium dioxide

Titanium dioxide is another manufactured pigment with ilmanite its natural source. It is available to the coating industry as the pure material or in blends containing calcium sulfate. Titanium dioxide is available in the anatase and rutile forms.

The rutile form has a refractive index of 2.76 and a brightness of 97 to 98. The crystal is tetragonal. Its specific gravity is 4.2. The anatase form has a refractive index of 2.52 with a brightness of 97 to 98. The tetragonal crystals of the rutile are smaller than are the anatase. It is generally accepted that the anatase is more blue-white than is the rutile. The average particle sizes of the titanium dioxide pigments is below one micron.

Because of its high brightness and high refractive index, titanium dioxide is used in pigment mixtures in which the titanium is usually present in relatively small amounts. It is for this reason that its rheological properties as such are not too important. It is easily dispersed with dispersing agents with a reasonable amount of mechanical agitation, and exhibits different flow characteristics under different concentrations and degrees of dispersion. As used practically, it does not disturb the flow characteristics of the major pigment mixture ingredient. However, when used by itself, it may flocculate when the adhesive is added.

Satin white

Satin white is a calcium sulfoaluminate usually manufactured in the mill by reacting hydrated lime and iron free sulfate of alumina. Very little specific information has been published about this material. Definite values on the particle size and refractive index cannot be assigned because of the wide varieties of satin white made.

Satin white imparts a viscous nature to coating mixtures. It is difficult to disperse, often requiring the use of high mechanical shear to break up all the lumps. Protective colloids are used sometimes to make satin white dispersions more free flowing. Protein adhesives made up in highly alkaline solutions appear to blend best with this alkaline pigment. Coating mixtures made with satin white have a tendency to thicken upon standing or even during use.

Talc

Talc is a form of hydrous magnesium silicate. Commercial talcs exhibit a variety of impure forms of this material. The fine grades range from 0.3 to 4.0 microns in diameter. The crystals are hexagonal and are reduced in size by grinding and milling. The refractive index varies, but averages about 1.57.

Talc is strongly hydrophobic, requiring wetting agents to wet it with water before dispersing. Its base exchange capacity is very small. The viscosity of talc suspensions is very stable, and is influenced and regulated by the adhesive used along with it.

Barium sulfate

Barium sulfate is used in the natural form (baryta) and in the precipitated form (blanc fixe). The latter form is used quite widely in the preparations of photographic coatings. Its refractive index is 1.64 with particle sizes ranging from 0.1 to 5.0 microns. It is ordinarily regarded as an easily dispersible pigment.

Zinc pigments

White zinc pigments are used in the paper coating industry in the forms of zinc oxide, zinc sulfide, and lithopone which is a blend of 30 per cent zinc sulfide and 70 per cent barium sulfate. The specific gravity of zinc sulfide is 4.00 and that of zinc oxide is 5.60. Their average particle size is about 0.25 microns with very few particles as large as 1.0 micron. Dispersion of these pigments is not troublesome.

The above pigments have all found their places in the coating of paper. Some are used generally while others are used for specialty purposes. The procedures for compounding them into the coating formulation will be given later.

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1961—production estimated at 35 million tons

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ALTHOUGH total paper and board production in 1961 is expected to reach a record high of 35 million tons, the indicated rate of increase of about 1.5 per cent over 1960 is substantially less than the long-term historic trend. Unless the basic national economy expands during 1961 more than anticipated, both the demand for and production of paper and board will experience the second consecutive year of lower-than-average annual growth rates.

Compared with 34.0 million tons in 1959, paper and board production is expected to total approximately 34.5 million tons in 1960, estimated on the basis of 9-month Bureau of Census data and trade association weekly statistics through November. Apparent consumption (production plus imports minus exports) is expected to total 39.8 fillion for 1961, against an estimated 39.4 million in 1960, and 38.8 million in 1959.

Looking ahead to 1961, very little change is anticipated in total economic activity in terms of constant dollar growth in the gross national product (GNP). However, a modest increase is expected in consumer expenditures for goods and services and a fair gain in aggregate construction activity. Also, a continuation of the upward trend in U. S. exports of various grades of paper and paperboard appears likely. These factors add a moderate degree of optimism to the market outlook for the industry in 1961. Imports, on the other hand, consisting primarily of newsprint from Canada, are expected to advance only slightly because the rate of increase for domestic consumption of newsprint is expected to slow down from the substantial gains recorded in 1959 and 1960.

The anticipated increase in 1961 total demand of around 550,000 tons of paper and board—consisting of gains of 450,000 tons in domestic consumption and 100,000 in exports —minus an estimated 50,000 tons increase in imports, results in an indicated net gain in domestic production of about 500,000 tons over the estimated 1960 figure of 34.5 million tons.

A lower 1961 per capita use is indicated, notwithstanding moderate, expected increases in both production and consumption, pointing up the fact that consumption is not expected to keep pace with the growth in population. A high of about 438 lbs. per person was reached in 1959 and 1960. The estimate for 1961 is 435 lbs. Table I shows the 1950-59 trend and 1960-61 estimates of production, imports, exports, apparent consumption, population and per capita consumption, The population figures for all years used in this computation include Hawaii and Alaska.

Overseas market expansion

One of the noteworthy, optimistic market developments during the past couple of years has been the strengthened foreign demand for paper and board, in particular, wood pulp. In recent years, U.S. manufacturers have intensified their efforts toward overseas market expansion.

For 20 or 30 years, paper and board exports have ranged around 2-3 per cent of domestic output. Because this percentage relationship has continued over a long period of years while domestic production has been increasing greatly, the actual volume of exports at the present time obviously has reached a substantial volume — close to 800,000 tons in 1959, and an estimated 900,000 tons in 1960 and 1,000,000 tons in 1961.

Wood pulp exports have gained markedly in the last few years, amounting to 515,000 tons in 1958, more than 650,000 tons in 1959, and about 1,150,000 tons estimated for 1960. The outlook for 1961 is a further substantial increase in pulp shipments to foreign paper and paperboard mills, as well as to nonpaper plants such as rayon and cellophane producers utilizing the dissolving grades of pulp.

While U. S. exports of various grades of paper, paperboard, and wood pulp are directed to some 60-70 countries throughout the world, the most important market area has been, and is expected to continue to be, the Western European countries.

Modest changes in domestic market

Because only modest changes are anticipated in the domestic market for most grades of pulp, paper, and board in 1961, as compared with 1960, a review of some of the developments of the past 12 months is particularly important. The trend toward enlarged domestic capacity that was strongly evident during practically all of the past decade continued through 1960, and further substantial capacity additions are underway and projected through 1963. This additional capacity will be needed to meet long-range projected demand. Because it takes 2-3 years to plan, engineer, and construct a modern mill, industry executives must be alert to future requirements, yet judiciousness in making such decisions has become a great responsibility.

Since 1956, market demands, as well as the total economic growth of the nation, have not kept pace with the long-term historic growth trend. As a result, actual market requirements have been somewhat below expectations. Even in 1959, when an exceptionally strong market developed, the increased demand and production for total paper and board did not compensate for the poor showing in the 1957-58 recession period and remained somewhat below the growth trend line. The slackening in demand during 1960 was reflected in only a moderate increase in production during the year of about 1.5 per cent over 1959, compared with the long-term projected annual growth factor of 3.8 per cent. As a consequence, production-to-capacity ratios declined during the year, and extremely strong competition developed within the industry. Under these conditions, prices on most grades of paper and paperboard were unable to advance to meet increased costs in overhead, including higher wage rates and fringe benefits. The majority of companies in the industry have reported lower dollar

earnings, nothwithstanding some gain in dollar sales of products. The present outlook for 1961 is for a continuation of keen competition. A high degree of statesmansnip will be required on the part of management during this readjustment period in the interest of an orderly market that will benefit not only the industry and its employees but also investors and the overall national economy.

The competitive situation in paper and board, except newsprint, is largely among domestic producers for the domestic market. Even in the case of newsprint, the source of supply is almost entirely within North America, specifically Canada and the United States. However, newsprint is a truly international commodity and the world supply-demand situation has an important effect upon the overall operating ratios of the mills, the price structure, and related factors.

Market wood pulp

In the case of wood pulp, a commodity also moving freely in international trade, the world supply-demand relationship is a significant factor from the standpoint of nonintegrated market pulp. Of total consumption of market pulp by paper and paperboard mills in the United States amounting to about 2.7 million tons in 1960, approximately 60 per cent was imported, principally from Canada but substantial quantities, some estimated 350,000 tons, originated in Northern Europe. Conversely, continental European countries and the United Kingdom provide a substantial market for U. S. market wood pulp. The availability of more than adequate supplies on the world market has caused price and quality competition to increase. Further, in the United States, market wood pulp has to meet the price challenge of some of the better grades of waste paper. These combined factors resulted, according to trade reports, in a growing quantity of spot market wood pulp offerings over the past several months, at prices materially below existing announced quarterly contract prices. The pressure to keep established customers, particularly in the domestic market, resulted in an announced reduction in market wood pulp prices, amounting to about 10 per cent, for the last quarter of 1960. The many smaller paper and paperboard mills consuming purchased pulp, commonly referred to as the nonintegrated mills, were already facing strong competition from fully integrated mill production. The reduced market pulp prices should assist the nonintegrated segment of the industry to maintain its relative position within the paper industry.

Table 1.—Total U.S. Paper and Board Production, Imports, Exports, Apparent Consumption, and Per Capita Consumption, and Population, 1950-61

Year	Production (000 short tons)[1]	Imports (000 short tons)	Exports (000 short tons)	Apparent[1] consumption (000 short tons)[2]	Population, excluding Armed Forces overseas[2] (millions)	Per capita consumption (pounds)
1950	24,375	4,998	297	29,076	151.9	382.9
1951	26,048	5,139	528	30,659	154.1	398.0
1952	24,424	5,173	499	29,098	156.5	371.9
1953	26,605	5,213	383	31,435	159.1	395.3
1954	26,876	5,169	591	31,454	161.9	388.5
1955	30,154	5,360	736	34,778	165.1	421.4
1956	31,441	5,799	669	36,571	168.1	435.2
1957	30,678	5,423	751	35,350	171.1	413.2
1958	30,814	5,100	728	35,186	174.1	404.3
1959	34,007	5,559	793	38,773	177.0	438.0
1960[3]	34,500	5,750	900	39,350	180.0	437.6
1961[4]	35,000	5,800	1,000	39,800	183.0	435.0

[1]Production plus imports minus exports.
[2]Includes estimates for the States of Alaska and Hawaii for all years.
[3]Estimate based on 9-month data for 1960.
[4]Estimated outlook.
Source: Bureau of the Census

Table 2.—Plant Equipment Expenditures Abroad by U.S. Paper and Allied Products Manufacturers, 1957-60
(Millions of dollars)

Year	Total	Canada	Latin America	Europe		Rest of World
				Common Market	Other Europe	
1957	144	120	11	4	4	5
1958	102	82	8	4	5	3
1959	90	75	5	3	4	3
1960	78	60	7	3	5	3
Total	414	337	31	14	18	14

Source: Office of Business Economics, U. S. Department of Commerce

Market wood pulp consumption by domestic paper and paperboard mills in the first 9 months of 1960 increased 4.4 per cent, while waste paper consumption declined nearly 2 per cent. According to the Bureau of Labor Statistics figures, waste paper prices at the end of September 1960 were nearly 35 per cent below 1959 — shared almost uniformly by all major grades of paper stock including the high grades; contract wood pulp prices, on the other hand, did not change during this period.

Because of the keen competition, the industry has intensified research to improve quality and to develop new products and applications. It has also stressed current and long-term market analysis, both foreign and domestic.

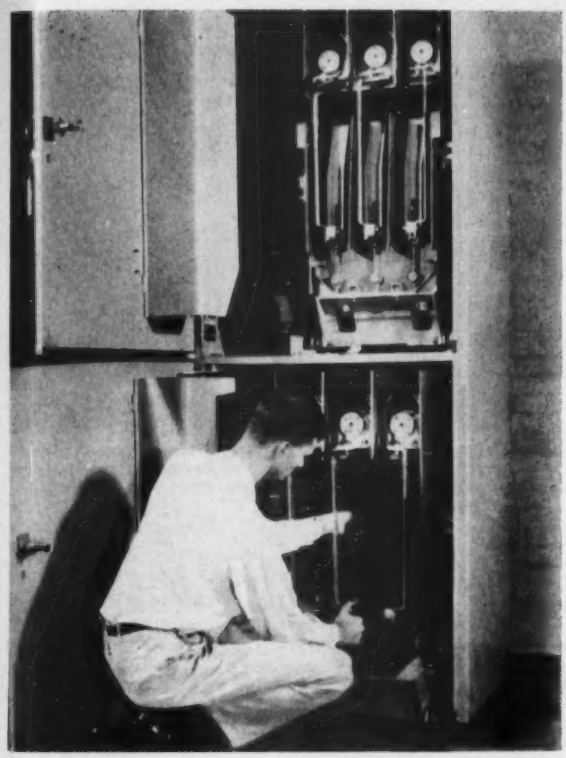
Trend toward integration continues

The trend toward vertical and horizontal integration continues. Many mergers have been made to meet these objectives. More and more pulp, paper, and board companies continue to enlarge their commercial timberland holdings with a view to assuring long-term pulpwood supplies. In addition to producing wood pulp, paper, and board, many companies have expanded into converting operations, especially in the field of containers and packaging. The growing product diversification is aimed at giving greater operating economies and production stability when demand for specific products fluctuates. Further, more emphasis is being placed upon plant modernization, operating efficiency, and cost reductions in manufacturing and distribution.

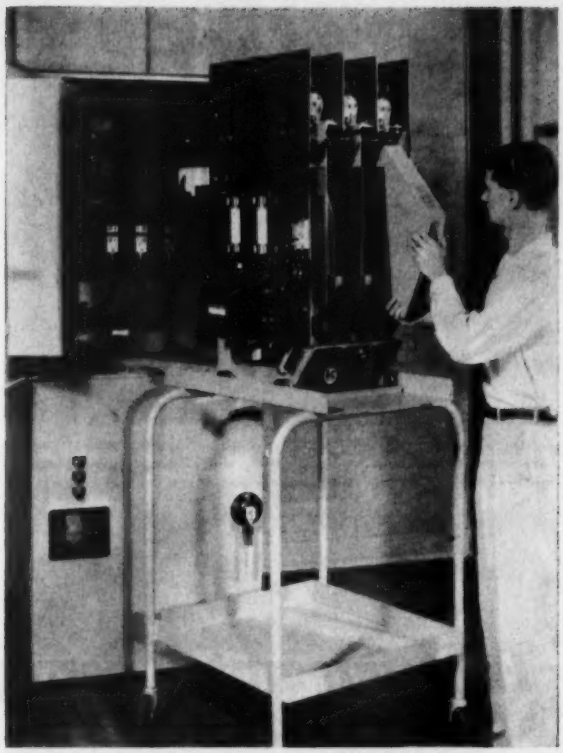
Overseas plant expansions

Another particularly significant development during 1960 was a greatly increased interest on the part of many important domestic manufacturers of pulp, paper, paperboard, and products in the potentials of overseas plant expansions are intended to meet the very rapidly growing demands for the products of the industry not alone in highly industrialized foreign countries but also in some of the lesser developed countries. The establishment of Common Market trading blocs is also an important factor causing pursuit of overseas investment opportunities. The size of present U. S. investments in pulp and paper operations in foreign lands is seldom recognized (Table 2).

During the period 1957-60, U. S. paper and allied products manufacturers invested $414 million in plant and equipment in foreign countries, more than 80 per cent in Canada. Investments in other parts of the world totaled some $77 million—$31 million in Latin America, $14 million in the European Common Market area, $18 million in other European countries, and $14 million in other sections of the world. According to plans of a number of important U. S. companies, further overseas investments are contemplated for plant and equipment expansion in the next 2 or 3 years. Such expenditures in the case of countries other than Canada may well far exceed the levels of the past several years.



With both doors of the Space-Maker control open, two complete high voltage type 456 contactors can be observed.



Arc chutes of the Space-Maker controller's type 456 contactor lift out easily to expose contacts for easy inspection.

Allis-Chalmers develops the most compact high-voltage controller on the market

ALLIS-CHALMERS has announced the successful development of the Space-Maker, a new concept in high-voltage industrial control. Available in ratings up to 1750 hp and 150 mva interrupting capacity at 2300 volts and up to 300 hp and 250 mva at 4000-5000 volts, it can be used for starting and controlling motors such as are used on jordans, vacuum pumps, refiners, chippers, conveyors, etc. Designed for space saving and ease of maintenance, there is little doubt that the new Space-Maker will find quick acceptance in the pulp and paper industry.

Market analysis conducted by Allis-Chalmers prior to the Space-Maker's development, disclosed that a significant and expanding market existed for high voltage motor control centers. In fact, as stated by R. C. Bown, manager of sales, at the first public showing in Chicago, "The market for high voltage equipment has been growing at a faster rate than general industrial power load."

The Space-Maker unit is exactly one-half the size of previous models. Unique features incorporated into its design are:

1. It is the first starter in the 2000-5000 voltage range to employ a two-high design, permitting two controllers in the same space previously occupied by a single unit. These two-high units may be grouped in lineups resulting in the industry's first high-voltage motor-control-centers.

2. It is the first completely draw-out control on the market in this voltage class.

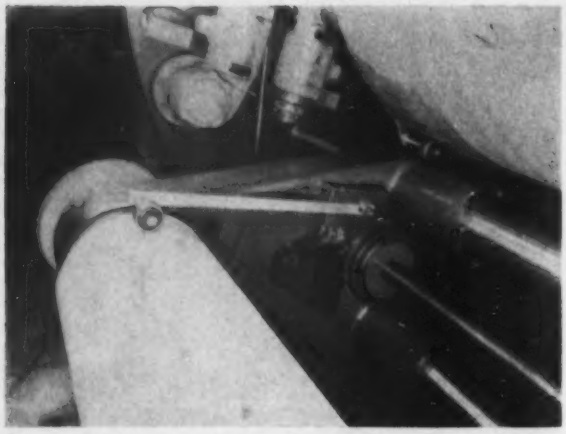
3. Its unique design is possible because of the brand new Type 456 air break contactor which is the newest, most compact 5 kv contactor on the market and offers significant operating benefits.

Type 456 contactor

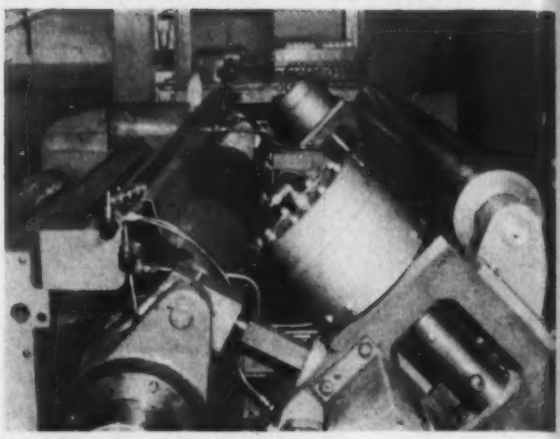
Type 400 ampere, 5-kv, 50 mva air brake contactor is the first in the industry to use the new glass polyester, flame-retardant, non-tracking Super Pyro-Shield insulation. Containing a patented mechanism which increases its carbon tracking resistance 100 to 200 times that of standard flame retardant polyesters and up to 1000 times that of phenolic materials, Super Pyro-Shield is used for all insulation in contact with high-voltage current carrying parts.

Faster and easier inspection is another important feature of this contactor. Arc chutes and barriers are

(Continued on page 787)



Paper tensioning device consists of a potentiometer, actuated by a linkage that rides the roll diameter, which proportionally adjusts the brake torque as the roll diameter decreases.



Single facer unit includes such features as tapered speed glue roll drive, precision ground corrugated rolls, pendant control station, easy convertibility from starch to silicate, etc.

Fully integrated corrugated board-making unit

A NEW concept in the production of corrugated paperboard — a fully integrated machine with every component, from feed to delivery end, redesigned to meet the competitive requirements of modern high-speed production — has been announced by S & S Corrugated Paper Machinery Co. Inc.

Known as the "Corrubiner" — a term emphasizing the straight line integration of corrugating and combining units — the machine incorporates the latest trends in automation, simplicity of operation, ease and economy of maintenance and rugged construction.

Sequential automatic order changing

Sequential automatic order changing is a step-controlled rather than a time-controlled sequencing that automatically takes full advantage of optimum time for each stage of order changeover. As each step is completed, the next one is automatically actuated and there is no built-in time delay to slow the changeover cycle. Also, the completion of each step triggers the next one in a chain-reaction sequence that eliminates waiting time but also assures that no operation will take place until the preceding step has been completed.

After pre-selecting the length of the sheet on the cut-off and the direction of index for the slitter, the operator has only to press the start button at the conclusion of a run.

Should it be desirable to stop the sequence at any step, the emergency button stops the double-backer, d-c motor and the automatic change-over controls. The pre-set information is cancelled while the sequence may be manually continued.

Built-in wiring

An important feature is the completely concealed wiring and recess-mounted control stations. The wiring is fitted in heavy-wall conduit and all control and power wiring are fed into a common terminal box on each machine. Wiring is performed according to the most stringent municipal electrical codes. The only wiring required when installing is to connect the power leads. The purchaser of the first machine of this type reports a saving of over $20,000 on electrical installation cost due to the pre-wiring feature.

Shaftless mill roll stand

The Type MRQ shaftless mill roll stand represents an important design advance that has been field-tested. The most noteworthy refinements are: faster production; more uniform product; less liner waste; faster splicing; one man operation without hoists; and constant paper tension.

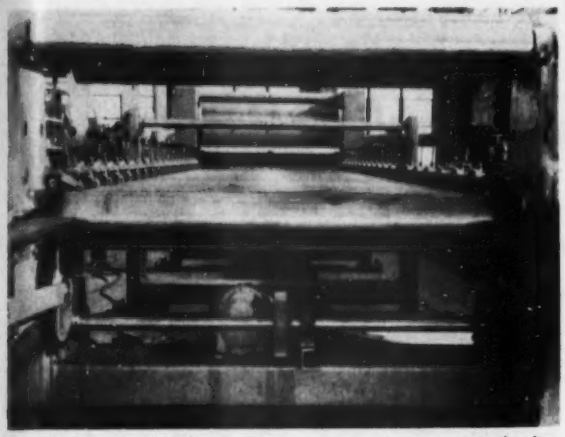
To maintain uniform paper tension a potentiometer, actuated by a linkage, rides the roll diameter. As the roll diameter decreases, brake torque is proportionately lessened, so that paper web pull is always the same.

Other features exclusive on the MRQ are: power loading and unloading of rolls up to 60-in.-dia.; power control of roll from loading position to running position; loading from either side of stand to allow top or bottom splices continuously at the discretion of the operator; all controls can be adjusted from the operating side of the machine.

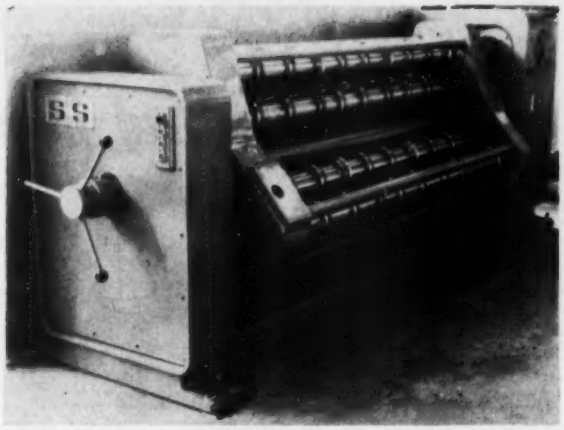
Single facer

To allow a precisely controlled amount of adhesive to be applied to the corrugating medium at all speeds, a mechanical differential type taper glue roll drive has been incorporated.

Also, a most significant quality control consideration has governed the making of corrugating rolls; these rolls are of forged chrome-molybdenum steel, case hardened after machining and precision ground to close tolerances, extreme accuracy and fine finish. The combination of advanced grinding techniques and the extremely hard working surfaces greatly increases roll life and maintains consistent accuracy in the exclusive flute contour.



Double Backer, Model HE, features automatic pneumatic loading and improved design rack.



Model HJM six bar Triplex slitter unit with 6-in.-dia. shafts and power indexing.

Contributing to the overall objective of simplifying machine operation, a pendant-type control station allows easy threading of liners and medium, and one-man operation. The pendant also keeps the controls away from heat and moisture of the machine.

Glue station

Since the function of the glue station is similar to that of the single-facing machine, a positive, trouble-free drive for the glue roll is provided by means of a tapered-speed, mechanical device. Pneumatic loading of the weight roller for flute height can be adjusted by means of a readily accessible knob on the operating side, and the weight lifting control may be operated either automatically or manually. The wrap of the single-face paper around the glue roller is easily adjustable; the frame is of heavy cast iron construction for greater rigidity and stability; while each glue station can be made inoperative by a pin-clutch.

Additional glue units can be added because of the modular design basis utilized.

Double backer

The double backer is of unique modular design, providing for mounting a great majority of moving parts in the three main floor sections with two connecting sections between these three units. These two sections — the heating or drying, and the cooling or pulling section — are designed similar to a bridge. This concept permits much more rapid erection in the box makers' plant; an important advantage since the size of the double backer makes shipment in a knocked down condition necessary.

The weight roll lifting mechanisms are hidden behind steel guards but are easily accessible and can be raised from the operating side of the machine. Among the many options offered is a belt drum stand with extra large belt drums for very high speed operations.

Improved design of the belt lifting mechanism has been developed, with a trouble-free rack and pinion unit, fully protected from heat and dirt.

Slitter

Whether 4-bar or 8-bar duplex, 6-bar or 12-bar triplex slitters are designed, all have been redesigned with heavier cast side frames, 6-in. shafts, power indexing and other engineering refinements. Slitters can be converted readily for use in the automatic corrugator, for either left or right hand drive, and all heads are interchangeable with other S & S converting-finishing slitter-scorers.

A separate automatic side register or edge control system is available for use with triplex slitters. By moving the slitter from side to side, following the web movement precisely, any lateral stray of the web is automatically adjusted.

Cut-off unit

The newly designed cut-off incorporates a simple balancing principle that does not interpose additional driving elements but adds many desirable operating results.

A balancing fly-wheel is mounted on the hub of the crank driving the knife bar. Thus, the flywheel is concentric with the knife bar but not keyed to it. The knife bar is driven by the conventional rotary drag link mechanism. On this latest design, a similar drag link mechanism, driven from the same internal gear but 180° out of phase, drives the balancing flywheel. Thus, as the knife is accelerating the flywheel is decelerating, and when the knife bar is decelerating the flywheel is accelerating.

All of the drive elements up to and including the internal gear have uniform angular velocity while only the crank and associated knife bars accelerate and decelerate. By the addition of only two moving parts (the flywheel and the link) the entire mechanism is balanced.

All parts are statically balanced so that the inertia of the wheel approximates that of all other rotating parts related to the mechanism, and one counterbalances the other. The resulting dampening effect substantially reduces vibration in the machine and wear of vital parts.

Welded knife bars reduce weight with subsequent reduction in inertia forces. The blades have double the usual number of jacking screws to increase setting accuracy and decrease adjustment resettings.

The cut-off register control consists of the following components: web scanner; selector switch; correction motor; control panel; and the mechanical phase shifting device. The components are closely integrated to assure proper registration between the continuously moving pre-printed web and the cut-off knife.

Sheet stacker

An automatic pile squaring device with mechanical, sequential controls is available with a standard high slip motor for slow acceleration of the piles. Three sets of adjustable hold-down springs on the upper slow delivery and two sets on the lower delivery result in uniform, squared piles. Smooth side delivery, with tilt tables installed between belts, prevent narrow sheets from tipping out of position.

Odor removal improves public relations

PETER W. SHERWOOD

Research Engineer

IN MOST instances, odors emitted by paper mills are not physiologically harmful. Instead, their nuisance value is generally psychological and involves relations between the manufacturing plant and its surrounding community. As such, the odor problem is dealt with as part of the broader picture of air pollution control with all of its implications of public relations and local restrictions.

This aspect is particularly important to the paper industry in the light of much evidence that public interest in the industrial odor problem is definitely on the increase. Despite the many contributions to odor, especially in municipal areas, a large segment of the public tends to single out paper mills as major offenders.

Some paper producing operations lend themselves to elimination of odor at the source. However, here each problem is a specific one and cannot be considered in a general discussion.

In other cases, it is possible to eliminate, or at least to reduce the extent of objectionable odor by converting the responsible compounds to a more innocuous form. Such conversion is effected by chemical conversion (oxidation, neutralization, hydrolysis, polymerization, etc.) This approach is rarely feasible, however, in the case of the complex odor-causing mixtures which abound in paper manufacturing, in many cases, defy chemical analysis.

Dispersion into the atmosphere may be adequate if meteorologic and aerodynamic conditions surrounding the plant site are favorable. Where a problem exists in this respect, improvement is possible in many cases by raising the stack height or the temperature and flow of the issuing waste gas.

Such atmospheric dispersion of odors by use of high stacks frequently reduces the problem but rarely solves completely. The main limitation is the dependence of such methods on the highly variable direction and magnitude of air flow.

Objectionable odors are conveyed to the atmosphere on solid and liquid particles, as well as in gaseous form. Particle components may be removed from the plant's effluent gases by filters, cyclones, electrostatic precipitators, etc., all of which are well-established tools in air-cleaning technique.

A different approach must be taken for the removal of odors which are emanated in gaseous form, and it is found that the majority of industrial odor problems are in this category.

Where a serious odor problem persists, industrially practicable methods of control may take any of the following four main forms: catalytic combustion of the odorous compound, removal by absorption or adsorption, and masking or counteracting of the odor by means of reodorants. Because of their particular suitability for meeting the odor problem in paper mills, these approaches will be the subject of our discussion.

Catalytic combustion

Combustion is feasible for destroying many types of odor-causing organic materials as well as hydrogen sulfide. To be effective, as a method of odor control, the oxidation must be complete and its reaction products must be innocuous (i.e., carbon dioxide, water, nitrogen, and sulfur dioxide which, though irritating, is much less objectionable than are many other sulfur compounds). Incomplete combustion may be worse than none at all for it superimposes irritating oxidation products, such as sulfur dioxide and nitrogen oxides on top of the remaining odor problem.

To achieve the required completeness of oxidation without recourse to very high temperatures, catalytic converters are employed. Here, the industrial waste is mixed with air and passed over a catalyst consisting of platinum or a platinum alloy on a porous carrier such as activated alumina. Operation of the unit is in the range of 650-1250°F.

Key to the economic operation of a catalytic oxidation unit is the amount of combustible gas which is present in the waste stream. With a combustibles content of 15-20 per cent of its lower explosive limit, it is usually possible to run the combustion unit without external fuel except during start-up. At 5 per cent of the lower explosive limit, or below this point, such a high firing temperatue is usually called for that this type of operation is no longer economical. On the other hand, very high concentrations of combustible components in the waste gas will result in the evolution of sufficient heat in the course of oxidation to permit recovery of waste heat which sometimes pays for the operation of the odor-removing combustion step.

As pointed out above, catalytic oxidation is not always the answer to odor removal and, even where use of this method is indicated, it must be checked by pilot-plant operation to ensure reliability (i.e., completeness) of deodorization, and to establish the operating problems and costs.

Absorption and adsorption

A second commonly employed method for odor removal involves absorption. This is a possible approach whenever the odorant component can be dissolved or emulsified in a low-cost liquid. Here, any one of a number of commercially common types of scrubbing equipment may be used. However, use of absorptive methods frequently introduces a problem in river pollution by the absorber's liquid effluent stream.

Absorption on activated charcoal is frequently an effective answer to odor problems. The method is highly effective for the removal of a wide range of odorous components. However, the economic range for adsorptive deodorization is limited to an initial odorant concentration between 2 and 5 ppm. This compares with a normal practical operating range between 1000 and 15000 ppm. in catalytic oxidation methods.

(Continued on page 787)

Technical Program of the 46th Annual TAPPI Meeting

THE 46TH ANNUAL TAPPI Meeting to be held at the Hotel Commodore, New York, promises to be one of the most rewarding meetings as indicated by the following program focused largely on fundamental problems facing the industry. While the program, as published here, may have undergone last minute minor changes, it is as complete as we could make it from the information available prior to our press deadline. We have also attempted to present results, where available, and a brief description of the subject matter in connection with the paper where abstracts were available.

MONDAY, Feb. 20, 1961

9:00 AM — SULPHITE PULPING SESSION I — (West Ball Room) — E. D. Cann, Chas. T. Main, Inc., Chairman.

1. "History and Applications of the Kopparfors Lining", By: R. A. Menzes, I. Olson and A. Ahlstrom.

2. "The Kopparfors Bag Type Digester Lining", By: G. Cape.

3. "The Mechanism of Acid Bisulphite Pulp I Batch Pulping", By: W. J. Nolan, University of Florida.

The results showed that no burning occurred, even when the cooks were brought to 148° C. within 30 min. of the time chips and liquor were mixed. In all cases, shredded chips cooked more rapidly and to higher screened yields than mill size chips. With shredded chips and 30 min. to maximum temperature, a screened yield of 50.6 per cent was obtained in a total cooking time of 120 min. The pulp contained 8.2 per cent lignin and the cellulose had a D. P. Number of 1900. Mill size chips could not be cooked satisfactorily at the rapid temperature schedule, maximum screened yields being less than 45 per cent.

In additional cooks it was found that the preimpregnation caused a definite decrease in the reaction rate, decreased screened yield and increased cellulose degradation. Preimpregnation of the shredded chips with ammonium bisulfate containing no free SO_2 had no effect on either reaction rate or screened yield but caused a slight increase in cellulose degradation.

4. "The Estimation of Spent Sulfite Liquor Concentration in Natural Waters", By: V. F. Felicetta & J. L. McCarthy, University of Washington.

9:00 AM — GENERAL SESSION — (Windsor Ball Room)

1. "Steam Stripping of Volatile and Odorous Substances from Kraft Pulp Mill Aqueous Streams", By: M. J. Matteson, L. N. Johanson and J. L. McCarthy, University of Washington.

It was found that the most prevalent sulfur compounds, hydrogen sulfide, methyl mercaptan, dimethyl sulfide and dimethyl disulfide could be over 95 per cent removed in an eight plate column, using from 7 to 10 lbs. of stripping steam per 100 lbs. of processed water. Operations emphasized the stripping of a blow gas condensate, both with and without refluxing. With refluxing operation, the major portion of the sulfur compounds removed appeared as a small quantity of overhead oil layer in association with terpenes.

2. "High Efficiency Melamine Wet Strength Resins", By: C. S. Maxwell and R. R. House, American Cyanamid Co.

Melamine resin colloids that are highly effective in imparting wet strength to papers by stock addition are described. It is pointed out that the improved (HE) colloids are effective not only under normal papermaking conditions but also under high sulfate conditions which are detrimental to the unmodified colloid.

3. "The Effect of Colors on the Opacity of Paper", By: M. Hayek, A. S. Deutch, and J. P. Neary, E. I. du Pont de Nemours, Inc.

9:00 AM — ALKALINE PULPING SESSION — (Windsor Terrace) — T. T. Collins, Packaging Corp. of America, Chairman.

1. "New Venturi Scrubber Developments — The Steam Atomized Venturi", By: P. H. West, Thilmany Pulp & Paper Co., H. P. Markant, Babcock & Wilcox Co., & J. H. Coulter, Babcock & Wilcox Co.

2. "Measurement of Kamyr Continuous Kraft Digester Cooking Cycle Using Radioactive Tracers", By: R. P. Hamilton, St. Regis Paper Co.

Results obtained during operation at a low chip level in the digester pointed out the importance of maintaining a high chip level in order to obtain maximum and proper benefit of the dwell time available. No spiraling or rotation of the active chip was noted during the descent through the digester. All chips came down in a straight vertical line. No evidence of channeling was obtained.

3. "A Rational Approach to Recovery Furnace Dissolvent Tank Design", By: C. R. P. Cash, Fibreboard Paper Products Corp.

A method for the gradual release of heat from recovery furnace smelt is proposed. Two liquid cooled rolls with their axes in the same horizontal plane are described as a suitable apparatus. Advantages in saving steam on shatter nozzles, reduction of air pollution, elimination of explosions and economy of construction are claimed.

4. Kraft vs NSSC Pulping, by: H. B. Wilder and S. T. Han, Institute of Paper Chemistry.

2:00 PM — MANPOWER SYMPOSIUM SESSION — (Grand Ball Room) — W. G. Torpey, Office of Civil & Defense Mobilization, Chairman.

1. "The Role of Engineering Technicians to Relieve Technical Personnel of Non-professional Tasks".

2. "Parallel Incentive Systems for Non-Supervisory and Supervisory Technical Personnel".

3. "The 'First Five Year' Plan of the Engineers Joint Council for Professional Development".

2:00 PM — CHEMICAL METHODS SESSION — (Windsor Ball Room) — W. K. Wilson, National Bureau of Standards, Chairman.

1. "The Spectrophotometric Determination of Lignin in Small Wood Samples", By: D. B. Johnson, W. E. Moore and L. C. Zank, Forest Products Laboratory.

2. "Qualitative Analysis of Fiber Blends", By: M. K. Wharton, National Bureau of Standards.

3. "Spectrophotofluorometric Studies of Degraded Cotton Celluloses", By: S. D. Toner and K. F. Plitt, National Bureau of Standards.

4. "A Study of the Fluorescence of Cellulosic Polymers", By: K. F. Plitt and S. D. Toner, National Bureau of Standards.

5. "Measurement of the pH of Paper by Means of a Surface Test with Glass Electrodes", By: J. H. Flynn and L. E. Smith, National Bureau of Standards.

TUESDAY, Feb. 21, 1961

9:00 AM — CORROSION SESSION I — (Grand Ball Room) — H. B. Harris, Union Bag-Camp Paper Corp., Chairman.

1. "Corrosion in Tall Oil Processing", By: H. C. Templeton, Alloy Steel Products Co.

2. "Electrolytic Corrosion Protection of Paper Mill Equipment", By: T. R. B. Watson, Corrosion Service Ltd., and W. A. Mueller, Pulp & Paper Research Institute of Canada.

3. "Report on Project No. 839 — "Corrosion Experience in ClO_2 Bleaching", Questionnaire by: R. E. L. Wheless, Union Bag-Camp Paper Corp.

4. "Manufacture & Proper Specifications for Type 304 Welded Stainless Steel Tubing for Kraft Evaporator Service", By: S. E. Doughty and W. J. Comerford, Carpenter Steel Co.

9:00 AM — CYLINDER BOARD SESSION I — (West Ball Room)

1. "Fundamentals of Drying Thick Porous Bodies", By: A. H. Nissan, Rensselaer Polytechnic Institute.

2. "Systems Available for Controlling Drying".

3. "Mill Experience with the Stamm Moisture System".

4. "Mill Experience with the Foxboro Moisture System", By: W. O. Kroeschell, Michigan Carton Co.

5. "Mill Experience with the Stickle System".

9:00 AM — SULPHITE PULPING SESSION II — (Windsor Ballroom) — E. D. Cann, Chas. T. Main Inc., Chairman.

1. "The Influence of Wood Damage on Sulphite Pulp Quality", By: J. E. Stone, Research Institute of Canada.

2. "Theory and Practice of A Norman Chipper", By: E. L. Crowley, Carthage Machine Co.

3. "New Chipper Design Features and Their Effect on Cooking Yields", By: R. M. Buechler, D. J. Murray Mfg. Co., L. L. Duncan and J. Haller.

In order to reduce sawdust, slivers and oversize chips to an absolute minimum, the D. J. Murray Mfg. Co. has developed a new chipper into which has been incorporated the offset v-type spout, the Uni-Chip helicoidal surface, and machines having up to fifteen knives.

The offset "v" supports the log so that there is no fish-tailing or bouncing. The Uni-Chip helicoidal surface gives a much more uniform chip than the standard disc face, considerably less bruising of the chip resulting in less sawdust, wearplates and knife covers last three to four times as long with Uni-Chip than with the standard chipper face, and because of a more uniform chip a greater yield can be obtained from the cook.

4. "Sulphite Pulping of Saw Kerf Chips from Douglas Fir", By: N. Sanyer and E. L. Keller, U. S. Forest Products Laboratory.
U.S. Forest Products Laboratory.

5. Panel Discussion.

9:00 AM — STATISTICS SESSION I — (Windsor Terrace Room) — J. F. Langmaid Jr., S. D. Warren Co., Chairman.

1. "Cumulative Sum Charts — A New Tool for Control of Manufacturing Processes", By: H. Mack Truax, Atlas Powder Co.

2. "Examples of Industrial Applications of Designed Experiments", By: Dorian Shainin, Rath & Strong, Inc.

9:00 AM — CHEMICAL PRODUCTS SESSION I — (Room B-C) — Dr. Paul R. Wiley, West Virginia Pulp & Paper Co., Chairman.

1. "Investigations on the Mechanism of Lignification", By: Walter J. Schubert and F. F. Nord, Fordham University.

Recent results, involving the feeding of labelled samples of D-glucose to Norway spruce trees, provide evidence that glucose is the carbohydrate precursor of lignin. Considering the central place that D-glucose occupies in plant biochemistry, it is significant that the plant also possesses the enzymes necessary to convert this monosaccharide into lignin as well.

Accordingly, present knowledge of the lignifaction process may be expressed schematically as follows: carbon dioxide→ carbohydrate (glucose)→ shikimic acid→ β-hydroxyphenylpyruvic acid→ primary lignin building stones→ secondary lignin building stones→ lignin.

2. "Decomposition of Lignin. I. Action of Compounds", By: Donald H. Grangaard, Kimberly-Clark Corp.

A number of years ago the observation was made that, on demethylating lignin with certain compounds, besides the demethylation, a more deep seated reaction occurred with the result that catechol was formed in considerable yield. Subsequent experiments carried out on model compounds indicate that compounds which possess a structure of the dihydroxydiphenylmethane type, or are capable of reacting with themselves, or with the amine, to form compounds of this type, are decomposed in a manner such that simple phenols result. Application of these results to lignin suggest that the catechol observed as a decomposition product probably arises from a guaiacylglycerol type of structure within the lignin. The structure of the dihydroxydiphenylmethane type necessary as a prerequisite to the decomposition arises as a result of the condensation of the amine with the free secondary alcohol group which exists in the guaiacylglycerol structure. The results obtained also suggest that, when lignin is reacted with an amine, or a phenol, using an acid catalyst, the linkage formed is probably a carbon to

carbon rather than an amino or ethereal linkage.

5. "The Degradation of Spruce Periodate-Formaldehyde Lignin by New Methods", By: M. R. Jain, McGill University and C. B. Purves, Pulp & Paper Research Institute of Canada.

A published method was used to condense the periodate lignin with about 32 parts of formaldehyde dissolved in 73 per cent sulfuric acid, and the major product (Ross-Potter lignin) was precipitated by water. Yield, 104 per cent by weight of the periodate lignin. The failure of the formaldehyde lignin to yield vanillin when suitably oxidized was confirmed; also the fact that thorough oxidation with alkaline potassium permanganate or with iodic acid yielded 4.7 per cent of benzene hexa- and penta-carboxylic acid, but no 1, 2, 3, 4, 5-benzene tetra-carboxylic acids. A convenient separation of these acids on a cellulose column was discovered. These results, and the failure of formaldehyde lignin to sulfonate in a sulfite cook, suggested that some of the formaldehyde had condensed in the α-positions of the phenylpropane building stones of lignin.

4. "De-etherification of Lignin by Aqueous Chlorine Solutions", By: K. V. Sarkanen, Cellulose Research Institute, State University of Forestry at Syracuse University, and R. W. Strauss, Nekoosa-Edwards Paper Co.

In order to study the general characteristics of the de-etherification reaction, the rates of methanol generation by chlorine were determined. The general conclusions reached are:

1. The demethylation reaction is quite rapid being completed in a few minutes at room temperature. 2. Two ortho-substituents other than phenolic hydroxyl inhibit or effectively retard the reaction. 3. The final methanol yield often remains below theoretical because of competitive chlorine substitutions in positions ortho to the methoxyl groups.

The rates and extents of demethylation of wood and lignin samples were amenable to interpretation in terms of the above principles. Indirectly, the extent of hydrolysis of ether links between guaiacyl propane units could be estimated from these data and appears to be pronounced in most softwood lignins. Etherified syringyl units in hardwood lignin, however, undergo de-etherification reactions with difficulty because of steric inhibition by rapidly introduced chlorine substituents.

2:00 PM — CORROSION SESSION II — (Grand Ball Room) — R. C. Stamm, West Virginia Pulp & Paper Co., Chairman.

1. "Stainless Steel Overlay Installation", By: C. R. Jelm, American Alloy Corp.
2. "Report on Project 522 — Alkaline Digester Corrosion", By: H. M. Canavan, Mutual Boiler & Machine Insurance Co.
3. Open discussion on stainless steel overlay.

2:00 PM — CYLINDER BOARD SESSION II — (West Ball Room)

1. "Mill Experience with the Hurletron System"
2. "Mill Experience with the Brown System"
3. Panel Discussion

2:00 PM — CHEMICAL PRODUCTS SESSION II — (Room B-C) — Dr. E. G. Locke, U. S. Forest Products Laboratory, Chairman.

1. "Investigations on Hardwood Lignins", By: Carmine J. Coscia and Walter J. Schubert, Fordham University.

Chromatographic analysis indicated that the hydrogenation products represent complicated mixtures of phenols and also possibly of some cyclohexyl-type derivatives as well.

A comparison of the ultraviolet spectra of the phenols obtained from the milled-wood lignins with the spectra of the untreated lignins shows that, although there was no shift of λ_{max} a shift to shorter wave lengths had in fact taken place for λ_{min}. In addition, appreciable decreases in both E_{max} and E_{min} were observable.

The infrared spectra of the phenols differ from the spectra of the untreated lignins principally in the absence of carbonyl absorption at 5.8 — 5.9μ and in a relative increase in free hydroxyl absorption at 2.9 — 3.0μ and 9.5μ and in phenolic hydroxyl absorption at 8.2μ.

2. "Examination of Western Hemlock Cambium for Lignin Precursors", By: Otto Goldschmid and H. L. Hergert, Rayonier Inc.

Current theories of lignin biosynthesis suggest that lignin precursors are present in the wood cambium, and that they are polymerized to form wood lignin in a zone adjacent to the cambium. An examination of western hemlock cambial constituents was therefore initiated. The following new compounds were identified: depsides of the following acids: caffeic-shikimic, ferulic-shikimic, ferulic-quinic, and paracoumaric-shikimic; and pinoresinol monoglucoside. Other compounds identified were: quinic acid, shikimic acid, fumaric acid, sequoyitol, coniferin, sucrose, fructose, glucose, leucocyanidins, catechin, and epicatechin.

3. "The Commercial Production of Acetic and Formic Acids from Neutral Sulfite Semi-Chemical Black Liquor", By: W. A. Biggs Jr., Sonoco Products Co., and J. T. Wise, W. R. Cook, W. H. Baxley, J. D. Robertson and J. E. Copenhaver.

The process consists of the concentration of the black liquor to 40-45 per cent solids, followed by approximately stoichiometric acidification with H_2SO_4 to liberate the acetic and formic acids from their sodium salts; this acidified liquor is solvent extracted counterconcurrently with 2-butanone (MEK) to recover the acids product; the mixed acetic and formic acids are separated by azeotropic distillation with ethylene dichloride; both acids are refined for sale — the acetic product being glacial (99.5+per cent) and the formic product being 90 per cent acid. The raffinate from the extraction is sold to Kraft Mills for its saltcake value.

Start-up and operational problems have been numerous and equipment corrosion proved to be very serious on most of the refining equipment. The economics of the over-all process integration is discussed with particular emphasis on the utility of such a process in improving the economics of cross-recovery between NSSC and Kraft Mills.

1:15 PM — CORRUGATED CONTAINER Session I — (Windsor Ball Room) — R. C. Hutchesno, Union Bag-Camp Paper Corp., Chairman.

Theme: "Stop and Take Count"

A. Richardson, Gaylord Container Div. Crown Zellerbach Corp., Moderator.

1. "The Performance of 39 — Flute Rolls", By: T. B. Haire, Continental Can Co.

The new contour C flute corrugator rolls with 39 flutes per ft. have been available for less than two years but already about 25 per cent of the C-flute single facers in this country are equipped with these rolls. The amazing thing about these rolls is that although flat crush, pin adhesion, and "runability" are as good as or better than board run on conventional rolls, the corrugating medium consumption is reduced.

Some of the things that affect take-up factor are machine speed, web tension, and width of paper. However, with readings covering all normal operating conditions, the new 39-flute rolls showed better than a 2-3 per cent saving of medium.

2. "Hooper Knife Results — A Three Year Trial", By: Larry Grogan, Maxwell Bros., R. W. Carzen, Baltimore Paper Box Co.

3. "Langston Electronically Controlled Knife-Operating Results", By: John Thompson, Hy-Grade Containers.

4. Question and Answer Period.

2:00 PM — DISSOLVING PULPS SESSION — (Windsor Terrace) — M. Heath, Buckeye Cellulose Corp., Chairman.

1. "Kinetics of the Thermal Degradation of Cellulose Nitrate as Measured by an Improved Taliani Procedure", By: M. A. Millett, Lawrence L. Zoch, Raymond M. Seborg, U. S. Forest Products Laboratory, Frank J. Masuelli Commanding Officer, Picatinny Arsenal.

On the basis of Arrhenius-type plots, it was shown that thermal degradation proceeds in a very orderly fashion despite wide variability in the stability level of the sample material. Test and processing variables were found to have small but significant effects on the course of the degradation process. With air as the confining gas during test, the calculated activation energies are independent of the general level of nitrate stability. With nitrogen as the confining gas, the apparent activation energy increases with increasing stability level.

2. "The Use of Holocellulose to Study Supermolecular Structure", By: R. N. Nelson, Buckeye Cellulose Corp.

3. "Preparation & Properties of Sulfoethyl Celluloses", By: L. F. McBurney and V. K. Grassie, Hercules Powder Co.

4. "The Evaluation of Viscose Filter Media", By: M. E. Kinsey, Tee-Pak Inc. and F. K. Mesek, Johnson & Johnson.

An improved method for the evaluation of the particle retention of viscose filter media and effect on product quality is described. A trial plant scale evaluation was made on production equipment with the use of the Coulter Counter for the evaluation of particle count and size retained by the filter media. The number of particles found in the filtered viscose is correlated with tests on finished product quality. The particle retention variation during the life of the filter media did not agree with commonly accepted viscose filtration theories. These results indicate an improved method for determining the optimum life of filter dressings in normal plant operations.

WEDNESDAY, Feb. 22, 1961

2:00 PM — GRAPHIC ARTS SESSION II (Grand Ball Room) — L. E. DeLauter, West Virginia Pulp & Paper Co., Chairman.

1. "Letterpress Inks — What Problems Do They Pose for the Paper Maker?", By: Philip P. Pope and W. F. Douglas, Pope and Gray Inc.
2. "Lithographic Inks and Developments in Lithography", By: Victor J. Porth, Interchemical Corp.
3. "The Present Status of Flexographic Ink — Developments Over the Past Ten Years", By: R. Scott, Sinclair & Valentine Co.
4. "Gravure Inks in Relationship to Printing Surfaces", By: W. S. Webster, Commercial Ink & Lacquer Co.
5. "A New Approach to the Measurement of Roughness and Porosity of Paper", By: J. W. Sweerman, Stichting Institut voor Grafische Techniek, Amsterdam, Holland, (to be presented by J. M. Fetsko, Lehigh University.)

9:00 AM — PULP PURIFICATION SESSION I — (West Ball Room) — F. Kraft, Marathon Corp., Chairman.

1. "Chelating Agents in the Stabilization of Groundwood Peroxide Bleaching Systems", By: R. D. Spitz, Dow Chemical Co.
2. "Chlorine Demand of Pulps", By: G. H. Baldauf and Bjorn O. Lehto, Allied Paper Co.

9:00 AM — CORRUGATED CONTAINER SESSION II — (Windsor Ball Room) — Thomas W. Carroll, Owens-Illinois, Chairman.

1. "The Use by Line Organization of Industrial Engineering Services", By: H. A. Buckley, Standard Paper Box.

There are basic I.E. policies that must be established, known, and followed. Without Industrial Engineering service, any Line organization is working blindly, is heading for trouble and inefficiency; crises and loss; used intelligently, these services can help to build and maintain an efficient, modern and profitable plant.

2. "Wage Payment Policies and Practices", By: E. Rhode, Elliot Rhode Associates.

Success in accomplishing wage administration according to modern policies will result in the following advantages:

1. Higher employee morale
2. Greater productivity
3. Lower costs
4. Greater employee earnings through a wage incentive.

3. "The Use of Work Measurement", By: F. H. Cloud, Packaging Corp. of America.

The most efficient and effective way to utilize work measurement information is through the catalogued standard data approach. The requirements for this approach will be explained and examples of catalogued standard data will be given.

4. "Production Reporting", By: C. Craigo, Hercules Box Co.
5. "Methods Improvement", By: J. C. Sprague, Green Bay Box Co.

Some of the techniques most commonly used including flow charts, multiple activity charts, right and left hand charts and methods — time — measurement are discussed briefly and two examples of simple analysis and improvement are given: (1) the reduction in machine changeover time through the use of multiple activity charts, and, (2) the improvement of motions used in a manual operation through motion economy techniques.

6. "Industrial Engineering in Waste Control", By: R. J. Buckley, Bathurst Containers Ltd.
7. "In-Plant Supervisor Training", By: R. S. Owen, R. S. Owen & Co.

9:00 AM — STATISTICS SESSION II — (Windsor Terrace) — M. S. Renner, Dewey & Almy Chemical Co., Chairman.

1. "The TAPPI Statistics Committee Attributes Sampling Program," By: W. E. Carlson, St. Regis Paper Co.
2. "Sequential Start-Up Procedure for a Pulp-Drying Machine", By: J. Glenn Olree, Buckeye Cellulose Corp.
3. "Application of Probability Theory to Paper Structure", By: O. Kallmes, St. Regis Paper Co.

Using probability theory, it has been possible to describe the structure of a model sheet composed of a pile of thin sheets; the properties of the model sheet and paper differ only slightly. This discussion will point out the considerations used in developing a theory of paper structure, the type of information obtainable from the theory, and the approach to be used in an attempt to inter-relate all paper properties.

4. "Technologies of Total Quality Control", By: W. J. Masser, General Electric.

9:00 AM — FOURDRINIER SESSION — (Room B-C) — W. H. Kennedy, Black-Clawson Co., Chairman, and R. W. Peters, Eastman Kodak Co., Moderator.

1. "Dandy Roll Practices, — A Committee Report", By: J. J. Hannigan, International Paper Co., and J. E. Schad, Consolidated Water Power & Paper Co.

By means of the questionnaire, the industry was canvassed for information concerning the following aspects of dandy roll operation: Grades, Dandy Support, Dandy Drives, Water

(Continued on page 787)

High-voltage controller

(Continued from page 781)

lifted out easily. Pole pieces can be rotated to expose the complete contact structure of all three phases without any obstruction. Coils can be changed quickly by removing one bolt and the coil connection.

The simplified mechanical design has a vertical stroke and double-break contacts with new floating guides for trouble-free operation. Use of a clapper type magnet eliminates the usual problems associated with large solenoid magnets. It puts all frictional moving surfaces where motion is small and driving forces are high.

The new Type 456 contactor retains the advantages of the 45° contacts, which allows natural arc movement into the chute, promotes a wedging action for higher effective contact pressures, and helps to keep contacts cleaner.

Drawout assembly

The drawout assembly is compact, functionally complete with the wheeled carriage containing the type 456 contactor, main power disconnect plugs, main power fuses and holders, control panel complete with transformer and transformer primary and secondary fuses, and a two pole, double throw normal-test switch.

Stationary line and load high-voltage power plugs are located on the rear wall of the 45-in. high compartment. The contactor carriage is rolled in and out of the stationary plugs by a helical drive mechanism. The racking mechanism is externally operated by a 10-in. long reversible handle providing effortless and convenient operation.

While the direct force required for plugging and unplugging the power plugs is about 175 lbs., the mechanical advantage obtained through the gear drive and operating handle reduces the actual handle force to about 40 lbs. The handle force for the free rolling of the contactor is 15 lbs.

Personnel safety

Maximum safety for personnel is provided in the design of the new motor controller. The door handle disconnects motor and line leads, while mechanical interlocking prevents (1) the door from being opened until the contactor is in the "racked out" position and (2) the carriage from being racked out while the contactor is closed.

An isolating shutter driven by the racking mechanism covers the line terminals when the carriage is racked out. This eliminates the possibility of maintenance personnel coming in contact with the line plugs when the carriage is withdrawn from the compartment. Additional personnel safety is provided by the door handle and actuating mechanism which requires that the compartment door be closed before the carriage can he racked in. An electrical interlock completely interrupts the continuity of the low voltage control power circuit before the main power plugs separate to prevent accidental power interruption on these plugs.

Odor removal

(Continued from page 784)

As an extension of adsorptive deodorization, Rhodia, Inc., has recently developed a method for treating activated charcoal beds with deodorant agents which add to the effectiveness of odor control.

Odor masking and odor counteracting

Considerable progress has been made in recent years in odor masking. In this scheme, a masking agent with an acceptable but stronger odor than the offending compound is injected into the waste gas stream. The effect of such treatment is to render the plant's emitted odor less objectionable, literally by overpowering it, and without actually eliminating it. Typical examples of odor masking agents are o-chlorophenol, pine oil, and camphor.

A main advantage of odor masking methods is that they call for only minor capital expenditure (use of automatic proportioning pumps in this service is on the increase). The chief cost is the continuing expense for the odor masking agent. Selection of the agent most suitable for a particular application is highly complex. Several organizations are specialized in the business of formulating and manufacturing such materials and most paper manufacturers leave this task to the care of the professional.

Once a suitable odor masking compound has been selected, and the best place for its introduction into the industrial waste system has been determined, it is still necessary to study its effectiveness, especially during the initial stages of its use by makng an odor survey in the area surrounding the plant.

By contrast, "odor counteraction" employs pairs of odors which are antagonistic to each other and tend to neutralize each other when smelled simultaneously. This approach is used especially in combatting multiple and complex odor sources. The odor counteractant (e.g., chlorophyll) is introduced into the main air movement, from the plant, usually at some point near the top of the discharge stack. By the time the air movement reaches the surrounding area, the counteractant is well mixed with the objectionable odor. Once again, the selection of counteractant to solve a particular odor problem must be left to the professional. Suppliers of odor masking agents are usually also in a position to service the paper industry's needs in regard to counteractants.

Tappi program

(Continued from page 786)

Showers, Steam Showers, Wipes, Setting in Relation to Wire, Dandy Face Design, Dandy seams, Failures, Location, Picking, Cleaning Methods, and Reason for Operation.

2. "Water Removal and Press Felt Life, (A Study of Paper Drying Efficiency as related to Felt Life)", By: L. G. Ward, F. C. Huyck.

3. "A Study of Fourdrinier Foils", By: H. E. Dunlap, Lodding Engineering Corp.

9:00 AM — GRAPHIC ARTS SESSION I — (Grand Ball Room) — James H. Wing, Continental Can Co. Inc., Chairman.

1. "Box Shop Quality Control", By: R. Harlow, Continental Can Co. Inc.

The statistical quality control method was discarded in favor of direct reporting of inspection results on a log-type chart. An inspection procedure wherein defects of each type are considered, coupled with the skill of the inspector, systematically ferrets out each and every defect.

Paperboard has significant influence on carton quality. Uniformity of board is essential for quality and efficient production. Paperboard that is outside standard limits, as it affects production, can be used to produce quality cartons by making corrections in the box-shop providing the condition is known and is uniform.

2. "Micro-components of Printing and their Effect on Mass Appearance — Illustrated with Photomicrographs and Case Histories", By: E. Schmatolla, Rogers Kellogg Corp.

3. "Heat Transfer Printing", By: R. D. Sheppard, Dennison Mfg. Co.

4. "Mill Experience with the Elvasize Process", By: B. A. Beardwood & C. J. Stapf, Jr., E. E. DuPont deNemours & Co., Inc.

The Elvasize Process is a unique method for surface sizing paper and paperboard with "Elvanol" polyvinyl alcohol. The process is a two-stage sizing technique — a borax solution pretreatment followed by a polyvinyl alcohol size. The borax reacts chemically with polyvinyl alcohol, cross-linking the polymer to form a firm gel. This reaction, which occurs at the surface of the sheet, prevents excessive penetration of the polyvinyl alcohol size.

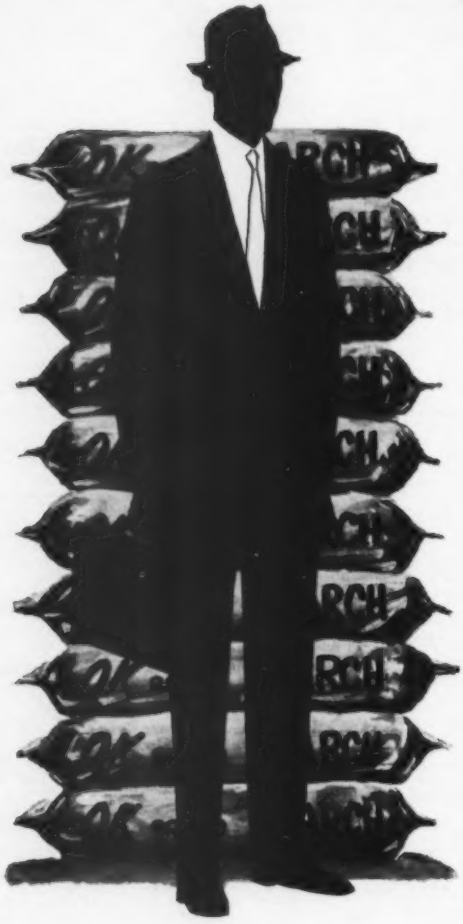
For sizing alkaline paper and paperboard, a one-stage version of the Elvasize Process has been developed. In this system the polyvinyl alcohol size solution is modified with boric acid. When the modified size solution is applied to the alkaline sheet, the boric acid is converted to the borate form which then reacts with polyvinyl alcohol. Mill trials using the one-stage Elvasize Process have been highly successful.

5. "Development of a Test Method for Surface Strength Evaluation", By: W. D. Shaeffer, E. E. Grund, J. M. Fetsko, and A. C. Zettlemoyer, Lehigh University.

2:00 PM — PULP PURIFICATION SESSION II — (West Ball Room) — H. L. Crosby, N. W. Kellogg Co., Moderator.

Panel Discussion — Bleach Plant Operating Problems.

(Continued on page 826)



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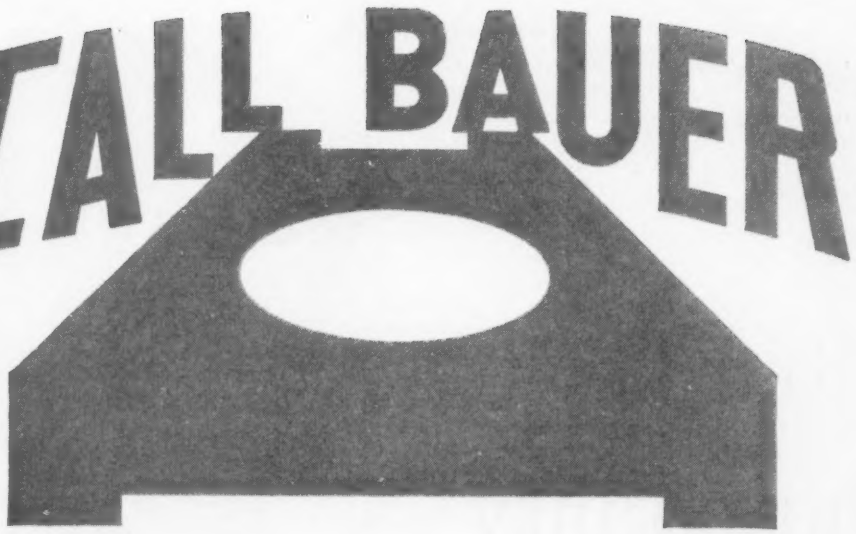

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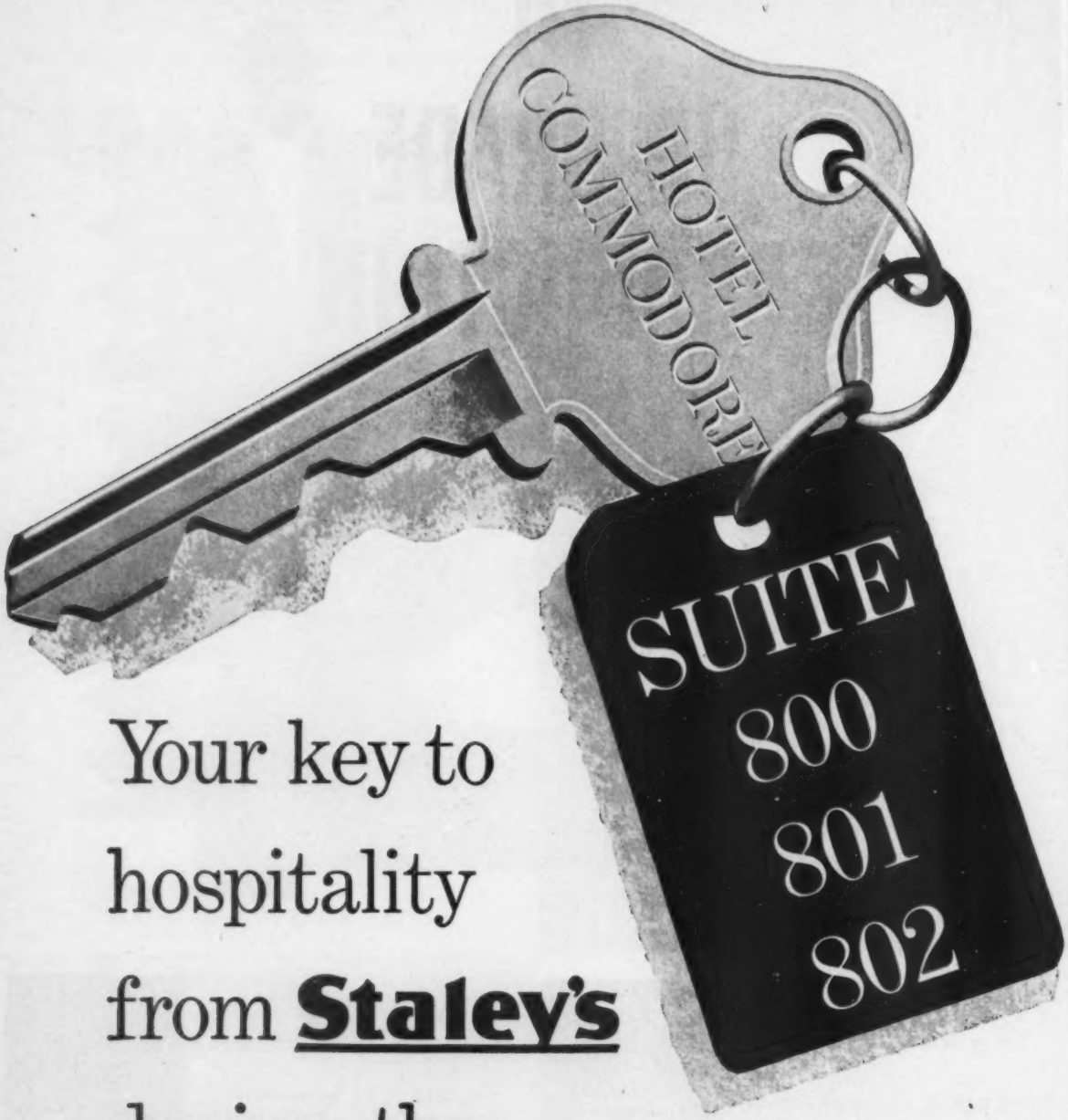

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Warren B. Bullock

Interest in foreign expansion continues — Present capacity is sufficient?

Common market idea is spreading

The common market idea is spreading to Africa. With Europe already divided into two common market areas, the Inner Six and the Outer Seven, first steps have been taken for the establishment of a common market area in Central America, possibly to be expanded later. Part of the Latin-American project is the establishment of a Central Bank for Integration, capitalized at $26,000,000, of which the United States provides $10,000,000. The African common market project has advanced so far that representatives of eleven French-speaking black republics have already met and are considering an African development fund with possible integration with the European trade bloc of which France is a member.

Paper & paperboard projects capacity

A joint survey by the paper and paperboard industries gives their combined total capacity in 1959 as 37,504,000 tons, and 38,847,000 tons in 1960 with projected capacity increases up to 40,488,000 tons in 1960 and 42,127,000 tons in 1963. This capacity is based on 310 days per year of operation in paper and 313 days in paperboard.

Survey on expansion

A survey of current expansion in the paper industry contrasts sharply with the feeling of some industry leaders that present capacity is sufficient to meet the demand for the next three to five years. Actual output during 1960, according to preliminary figures, increased only to 34,500,000 as compared with 34,000,000 tons in 1959, an increase of 1.5 per cent as compared with a long time average of 3.8 per cent per year. However the 1960 operations were at a higher percentage of capacity than in 1959, even though the cost-price squeeze curtailed net income while sales expanded. The most successful field during the year was in newsprint, with output and demand increasing month by month to repeated new high levels.

In the expansion field, a survey by the Department of Commerce puts the expenditure for new plants and equipment by the paper and allied products industries at 580 million dollars in 1958, 630 million in 1959 and 750 million in 1960, with a projected expenditure of 160 million in the first quarter of 1961.

Southern states lead in world pulpwood harvest

The Southern states led the world in the 1960 pulpwood harvest, with a value of $455,000,000, an increase of 12 per cent over 1958. This is a larger output of pulpwood than all of the remainder of the United States, more than any other single country and more than any other area of comparable size in the world.

Current expansions and corporate changes

The explosive manner in which United States papermaking interests are expanding into the Latin American field is accented by the announcement that *International Paper Co.*, in an enterprise involving its expenditure of some $30,000,000, will co-operate with the *W. R. Grace Co.* in extensive operations in Colombia, Puerto Rico and Mexico. The Grace company, which has been a leader in the development of the paper industry in Latin America, thus acquires a powerful partner in its plans for further development. Grace and International will have a half interest each in a bagasse pulp and paper mill being built at Cali, Colombia. Through the pending deal with Grace, International will purchase the bagasse pulp and paper mill set up by Grace in Arecibo, Puerto Rico, as well as converting plants in San Juan, Puerto Rico, and Mexico City. These converting plants produce cartons, boxes and corrugated shipping containers.

While many industry leaders have said that the industry is expanding too rapidly, details have been disclosed of the earlier announcement that *Scott Paper Co.* and *Mead Corp.* will finance a $35,000,000 expansion of their jointly owned *Brunswick Pulp & Paper Co.* of Brunswick, Ga. Under the agreement, each company will subscribe to 100,000 shares of the Brunswick stock, Mead paying $10,000,000 in cash. Scott will pay for its subscription by exchanging 1,000,000 shares of its minority interest in British Columbia Forest Industries Ltd. A group of banks will provide $10,000,000 and an insurance company nearly $30,000,000 additional. The surplus of these loans will be used to re-finance other Brunswick obligations. The expansion will double the Brunswick output of 550 tons of bleached kraft pulp per day.

• • •

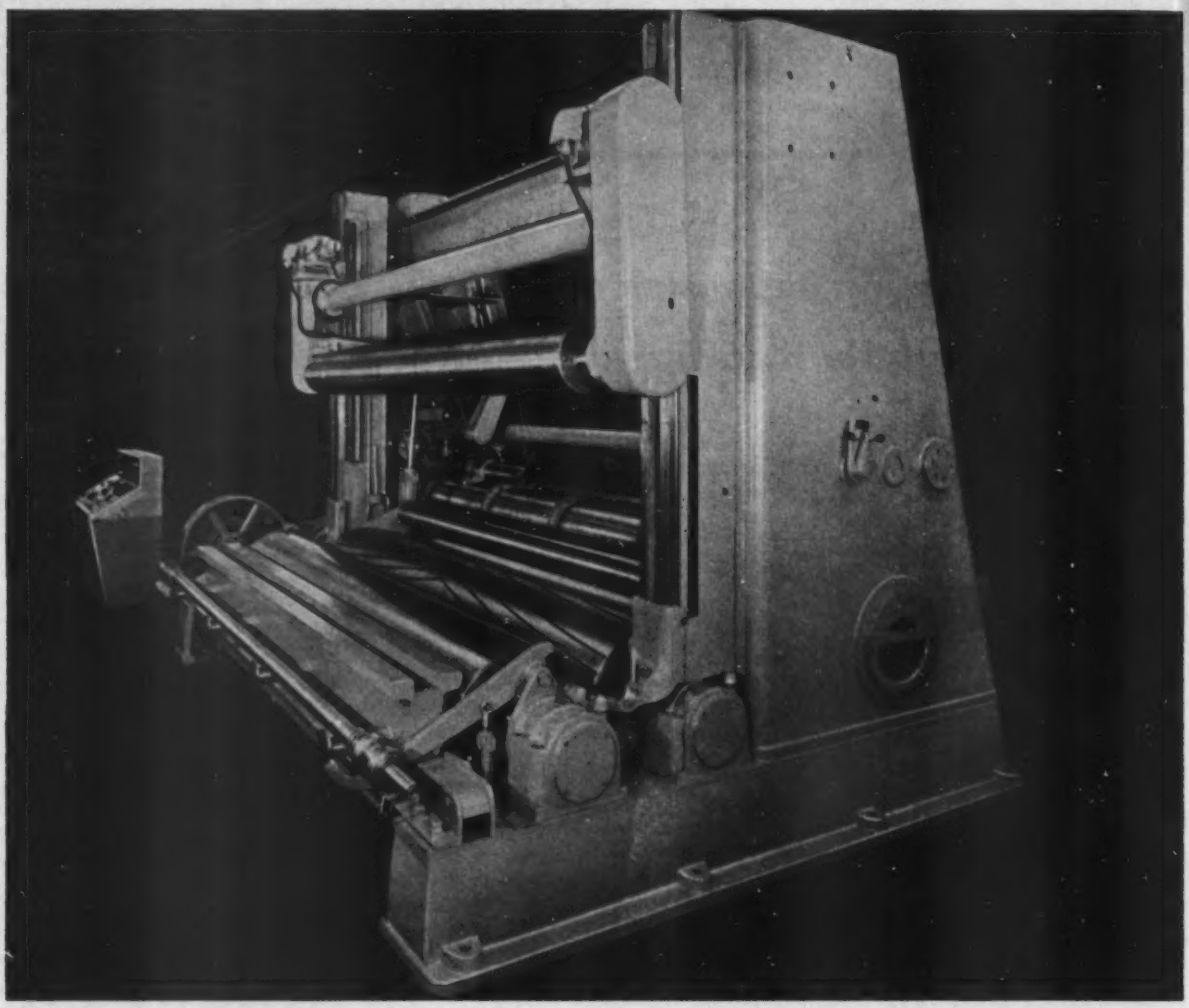
Penobscot Chemical Fibre Co. is raising $3,500,000 through the issuance of 5¾ per cent, twenty-year debentures.

• • •

Foster D. Snell Inc. of New York, N.Y., a chemical consultant firm, has acquired *Calkin & Baley Inc.*, industrial consultants. Calkin & Baley will

Salute to Writing Paper Manufacturer's Association

The 1961 Paper Week annual banquet will be a salute to the Writing Paper Manufacturers' Association in honor of the centennial anniversary of the oldest trade association in the United States. The fifth generation of the Crane company, with its long record of operation at Dalton, Mass., will be represented by Arthur E. Crane who will give an historical record of the Association.



THE SPEEDMASTER

New Langston winder handles large-diameter rolls of both paper and board, speeds up to 7500 fpm

This all-new-design Langston winder incorporates many features that make it possible to wind superior quality rolls over a wide range of conditions. Built-in provisions insure uniform roll density, prevent annular rings, and readily permit separation of rolls. Flexibility of operation, due to design features, facilitates winding of any grade paper —including dense printing grades, both coated and uncoated, where large-diameter rolls are required.

Proper web tension control is essential for superior winder performance. The Speedmaster is available with either manual, constant or tapered tension, as desired. Details of design vary to suit application requirements. The draw between the rewind drums can also be controlled automatically. As the weight of the roll increases, loading of the rider roll is automatically compensated. And toward the finish of a large roll, the rewind shaft brackets can be power lifted to reduce nip pressure further.

Slitters are of the new Langston precision design, guaranteed to run true within .001 in., thereby minimizing variations in web widths. For more precise control over spreading, the slitters and spreader roll are carried in a common cradle, rotatable over 60 degrees.

Operation is facilitated by an automatic threading device. Options available are: automatic shaft loader, roll ejector, power engagement and disengagement of slitters, and shaft stripper. The ways for the rider roll and rewind shaft carriages are removable for easy maintenance.

Write for detailed engineering information on this new Langston *Speedmaster* winder. Samuel M. Langston Co., 6th & Jefferson Sts., Camden 4, New Jersey.

Langston LEADERSHIP . . . BY DESIGN

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be operated as a wholly-owned subsidiary of the Snell firm. At the same time, Snell announced its decision to close its Davis & Bennett Division at Worcester, Mass.

• • •

Packaging Corp. of America, which a month ago announced its entry into the plastics field by the purchase of the *Worcester Molded Plastics Co.,* has added a second similar unit with the acquisition of the *Lakeside Mfg. Co.* of Milwaukee, Wis.

• • •

Kimberly-Clark Corp., also interested in foreign expansion, has crystalized its foreign operations through a subsidiary, *Kimberly-Clark International, S.A.,* with W. W. Cross (a vice president of the parent company) as its president.

• • •

National Vulcanized Fibre Co. of Wilmington, Del., has acquired *Fisher Mfg. Co. Inc.,* Hartwell, Ga. Fisher is a major supplier of metal, vulcanized fiber, fiberglass, and fiber-armored materials handling receptacles for the southern textile industry.

• • •

Dominion Tar & Chemical Co. Ltd. of Montreal has purchased *Prairie Fibreboard Ltd.,* Saskatoon, Saskatchewan, Canada. Under the new ownership, operations at the plant will be similar to present production, but a plan for more economical operation will go into effect.

• • •

Crown Zellerbach Canada Ltd., Vancouver, B.C., has consolidated three of its paper distributors under one name, *Crown Zellerbach Paper Co. Ltd.* The three are *Clark Papers Ltd.; Hudson Paper Co. Ltd.;* and *Columbia Paper Co. Ltd.*

• • •

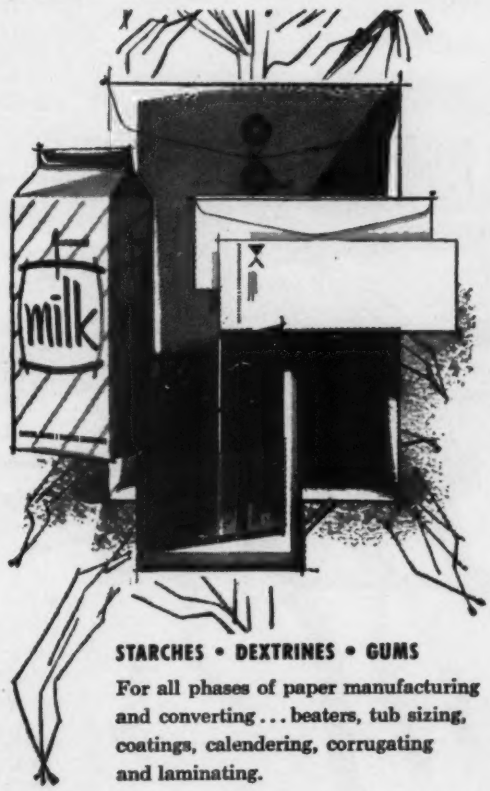
The board of directors of *Kleen-Stik Products Inc.* has agreed to transfer its business and name to Kleen-Stik Products Inc., a wholly-owned subsidiary of *National Starch & Chemical Corp.,* New York. Kleen-Stik will operate as a separate corporation under its present management, and headquarters will be continued at its present location in Chicago, Ill.

• • •

The pending effort of the Federal Trade Commission to break up the consolidation of various paper mills into the *Scott Paper Co.* will reach the Federal courts by appeal of Scott from an anti-merger order by the Commission. Formal filing of a complaint against Scott, which has been fighting the issue before the Commission since 1956, would require Scott to sell the

(Continued on page 826)

Look what happened to the corn we took off the cob



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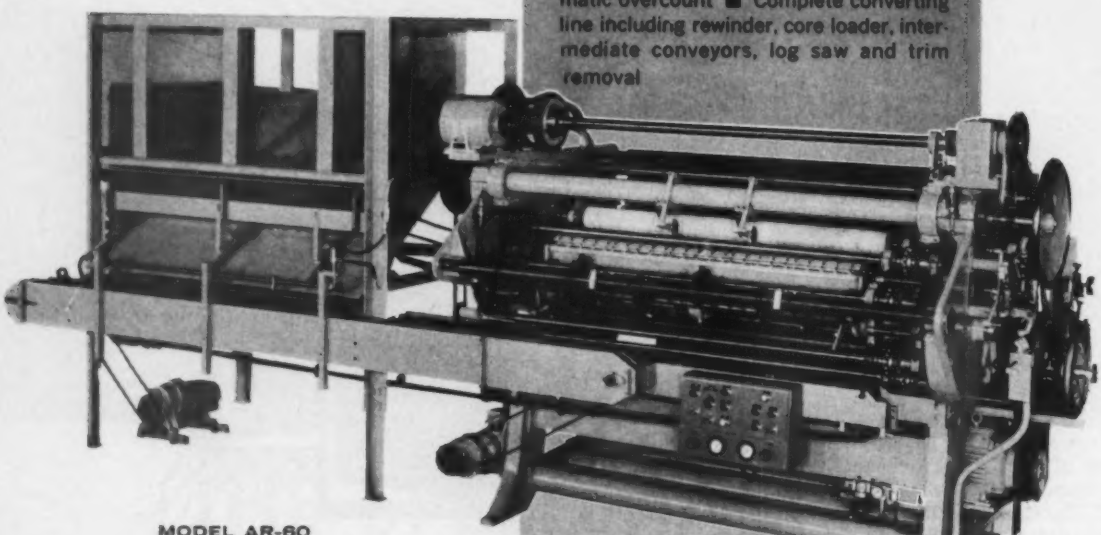
*Actual production figures based on 4½" x 4½" sheet size, 650 count rolls — 96 roll cases off 2-81" rewinders.



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Paper—a Luxury to Space Travelers

Dr. I. M. Levitt, director of the Fels Planetarium in Philadelphia has predicted that 75 years from now (in the year 2035, paper will be a luxury to space travelers and those human beings living on the moon.

"Try", he said, "to picture yourself in a world where there is little or no paper. Think of trying to send messages without paper or working out some problem in this world where scratch pads are at a premium. You will then realize how important to our life and our being paper has become.

"Because of the atmospheric and geological conditions on the moon and elsewhere in space, the effort to make paper will tax our resources and ingenuity. It may be necessary for the paper industry on earth to export this 'necessary luxury' to the space dweller".

Dr. Levitt made these statements during a recently held ceremonial Time Capsule burial at the Paterson Parchment Paper Co. in Bristol, Pa. This occasion marked the company's 75th anniversary. A microfilm record of Dr. Levitt's predictions together with documents and memorbilia from the Paterson Co.'s history were placed in an air-tight, stainless steel cylinder.

Also sealed in the Time Capsule, which is to be unearthed and opened on Paterson's 150th anniversary in 2035, were a number of scientific objects recently developed in the laboratories of the Franklin Institute in Philadelphia.

E. R. Leonhard, president of the company, gave a brief address and told the guests that this ceremony was tape recorded and that the recording will also be placed in the capsule. He said that the event was being recorded "So our grandchildren and great-grandchildren who open this capsule three quarters of a century from now will know what Paterson is doing for them today".

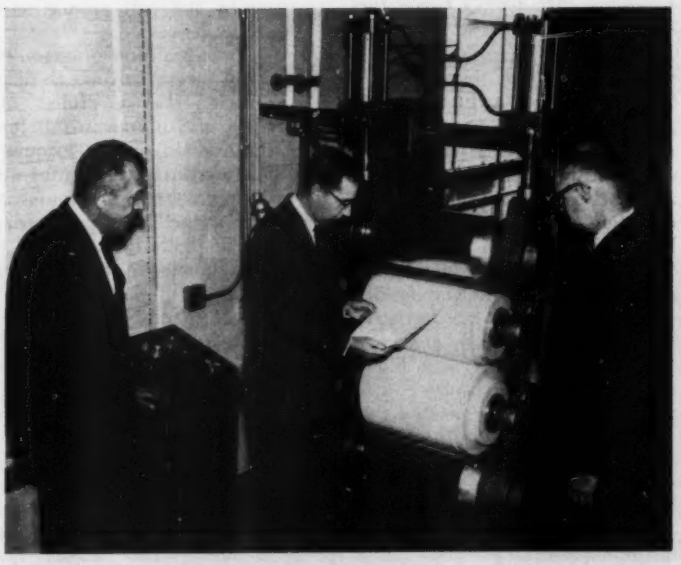
Subject Announced for 1961 Bolton Essay Contest

"Privileges of the Free Enterprise System" is the subject of the 1961 Bolton Award Essay Contest.

This is the 14th in a series of annual essay contests which is sponsored by the Paper Industry Management Association of Chicago, Ill., and co-sponsored by John W. Bolton & Sons Inc. of Lawrence, Mass.

The contest is open to all persons engaged in the pulp, paper and paper converting industry in the United States and Canada. Contestants should submit their papers typed with double spacing on one side only and on plain sheets, 8½ by 11 in. Papers should be confined to 1500 words. Cover sheets ONLY should include the author's

Supercalender Installed At Institute of Paper Chemistry



New supercalender is being examined by C. L. Carey and T. A. Howells of the Institute of Paper Chemistry and by Edward A. Hertel of Hertel Machine Co.

A new laboratory supercalender has been placed in operation at the Institute of Paper Chemistry laboratories in Appleton, Wis. This unit was developed to meet the needs of the Institute's desire for a laboratory unit versatile enough to meet the needs of their varied research program. Hertel Machine Co. of Menasha, Wis., (working with Institute personnel) designed and built this calender as a prototype.

The unit is of open-face design to permit easy changing of roll arrangements and with dimensions adequate for four-roll operation. The initial arrangement of the supercalender consists of chilled iron top and bottom rolls of 10-in. diameter and intermediate-filled rolls with 12-in. and 14-in. diameters.

Other design features include a 15-in. face to accommodate coatings from the Institute's 12-in. experimental coater and an hydraulic system for operation at roll loadings up to 3,000 lbs. per lineal inch. Although initial operation will be limited to sheet treatment at slow speeds, bearings and other features of the machine are designed for ultimate operation at speeds up to 2,000 fpm.

name, home address, job title and name and address of the mill. The contest period extends from January 1, 1961 until midnight March 31, 1961. All entries must be postmarked before midnight March 31, 1961, and mailed to the Secretary and Treasurer, Paper Industry Management Association, 10 North Clark Street, Chicago 2, Ill.

Contest winners will be announced at the 42nd National Convention of the Paper Industry Management Association to be held at Jacksonville, Fla., on June 7.

New leasing plan adopted

The Nationwide Leasing Co. of Chicago, Ill., has adopted a new plan which will enable paper and paper products companies to lease equipment for terms as long as six to 12 years.

The new plan features level quarterly payments for the term of the lease. No security deposit is required. To qualify for this extra-long-term lease, companies must meet the following conditions:

1. They must have a tangible net worth of at least $1 million; 2. they must show a five-year record of profitable operations; and 3. equipment desired must have a depreciable life greater than the lease term.

Further information on this new plan can be obtained by writing to Department LT, Nationwide Leasing Co., 11 So. LaSalle St., Chicago 3, Ill.

Foxboro Introduces Electronic Stock-Blending Control System

A new electronic stock-blending control system will be introduced by Foxboro Co. at the TAPPI Convention in New York's Hotel Commodore, February 19 to 23. The control system, continuously proportioning two stocks, an additive and a dye flow in simulated operation, utilizes the new Foxboro Electronic Consotrol instruments, assembled in a compact modular control center, complete with graphic display.

Since the stock blending control system is based on flow measurements made by Foxboro Magnetic Flow Meters, there will be a display of the most recent advances in the electro-magnetic metering line. For stock chest level measurements involved in the system, an electronic flange-mounted, level transmitter will be shown.

Also in actual operation will be quality control instruments such as the sheet weight profiler and caliper profiler. A new scanning-type moisture measuring head assemble for on-machine moisture profiling, together with other paper-making instrumentation will also be demonstrated.

recent expansions

Fibreboard's San Joaquin Mill

Now Complete and in Full Production

The expansion program of California's only virgin kraft pulp and paperboard mill — the San Joaquin Pulp and Board Mill of Fibreboard Paper Products Corp. — is now completed and full production schedules are underway.

The expansion program, which will result in more than a third productive capacity, was a project of Bechtel Corp. of San Francisco. Before the new construction, the San Joaquin plant was manufacturing corrugating medium for shipping container manufacture as well as bleached kraft paperboard for use in the production of food cartons in the company's six Western carton plants.

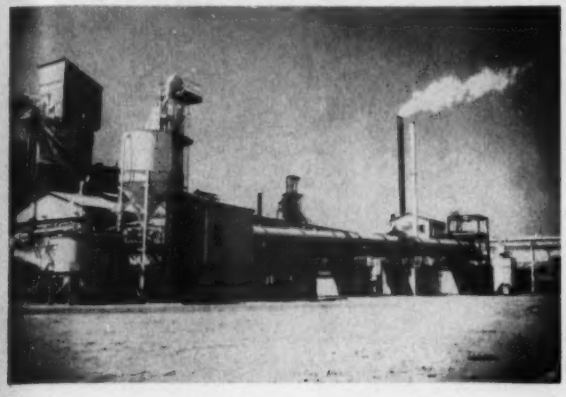
During the expansion, a third paperboard machine, complete with pulp processing system and additional raw material handling equipment, was installed to the original San Joaquin facility (built in 1948-49). The new mill was constructed to initially produce 72,000 tons of kraft linerboard per year, bringing the total yearly capacity of the plant to over 200,000 tons. This expansion also makes Fibreboard's shipping container manufacture a fully integrated operation.

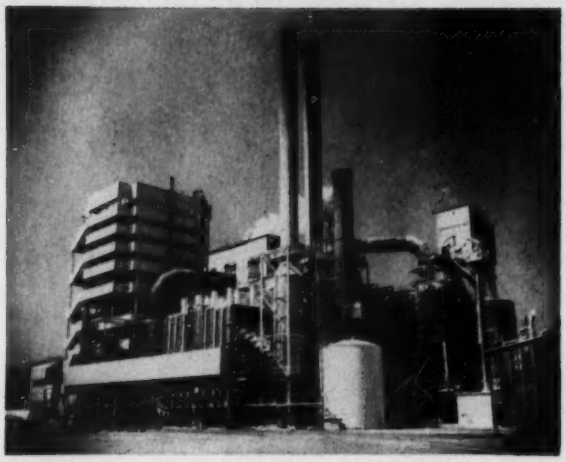
A 172-in., Black-Clawson fourdrinier paperboard machine which will produce kraft liner for use in the company's six Western container manufacturing plants, is the heart of the new facility. An advanced system of air and water effluent controls are engineered by Fibreboard for the No. 3 machine. Stock for the No. 3 is refined through two, 800-hp., Jones Double-D Disc Refiners and three, 400-hp., Jones Majestic Jordans. The machine was manufactured at the Watertown, N.Y., plant of Black-Clawson Co. It has a 172-in.-wide and 133-ft.-long fourdrinier section which is of the permanent cantilever, quick-wire-changing type. The total length of the No. 3 machine is 360 ft. The primary and secondary air-loaded headboxes are by Valley Iron Works and are designed to operate at a speed range of from 250 to 1500 fpm. and to operate on 18- to 90- lb. natural kraft linerboard.

Other major components of the new construction include chip handling, digesting, chemical recovery, causticizing, pulp washing and pulp refining facilities to support the No. 3 machine. To enable the capacity of the machine to be doubled economically in the future, a 400-ton, Babcock & Wilcox recovery furnace and a 9-ft.-dia. by 250-ft.-long Traylor lime kiln were also built.

The new chip-handling facilities provide for improved unloading, outdoor storage by wood specie, as well as added facilities for reclaiming and

New 250-ft.-long, 9-ft. diameter lime kiln installed for the No. 3 machine. This kiln will be adequate to supply the needs for anticipated future expansion.





The recovery boiler shown on the left, the precipitator in the center, the scrubbers and the stack are all components of the New No. 3. Units to the right of the foreground tank are part of the original mill.

screening of wood chips. A chip-conveying system, designed and fabricated by Rader Pneumatics of Portland, Ore., was installed to allow chips to be conveyed to the manufacturing process by a pneumatic chip-handling system. It has a capacity of 50 units per hour with air supplied by a 350-hp., Sutorbuilt, Heavy-Duty Blower delivering 11,400 cfm. at 6 psi.

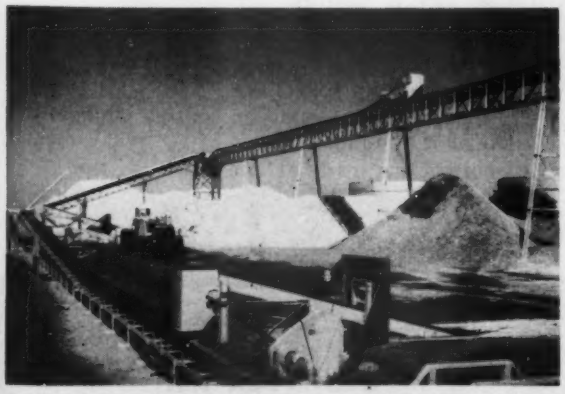
The continuous pulp digester is a Kamyr 100-ft.-tall, 5,700-cu.-ft. installation. After screening and blending operations are completed, chips are conveyed to this Kamyr digester.

Hot stock screening is also featured in the mill — this is a process designed to improve stock washing while also making it more economical. In conventional screening, the pulp from the digester is first washed and then screened. In hot stock or black stock screening the hot pulp in its black liquor is screened and then washed.

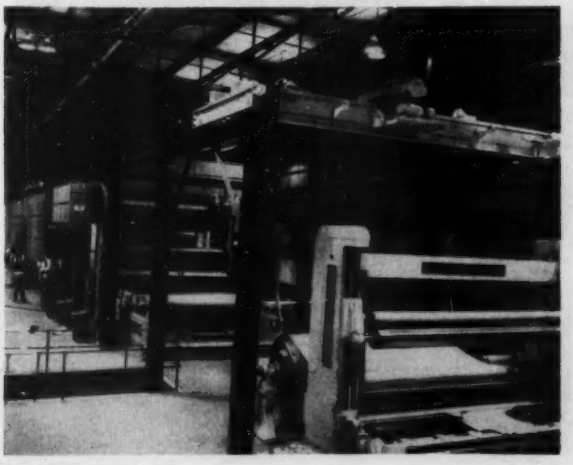
(Continued on page 802)

New No. 3 machine building houses the equipment for making unbleached kraft linerboard. The structure is 486 ft. long, 65 ft. wide and 58 ft. high. It is steel structure sheathed in asbestos-cement siding.

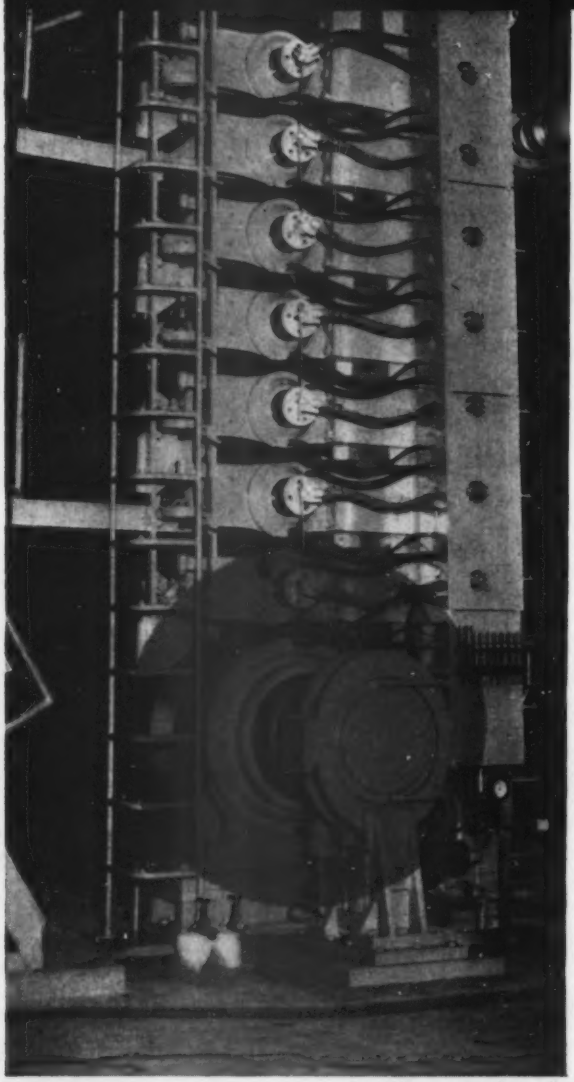
One of the first rolls of kraft linerboard manufactured on the new No. 3 is shown on the winder. The roll is 160 in. wide. It was cut into three sections, each weighing more than 3,000 lbs.



An elevated steel-supported belt conveyor discharges wood chips through a chipper onto piles according to species. Motor-propelled tripper is operated by remote control.



Here's How the **ACCRA-NIP*** *calender roll bending control reduces operating costs*



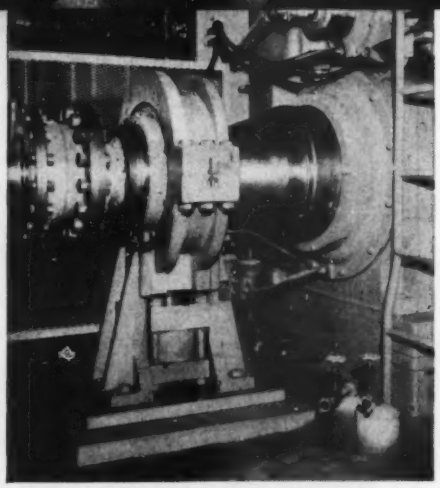
You Get a Uniform Sheet on Every Grade Change WITHOUT REGRINDING CROWNS

*This significant new Black-Clawson design concept can help reduce the profit squeeze in many a paper mill. The ingenious Accra-Nip bottom roll bending device varies the crown automatically to suit grade change operating conditions. Here are the cost-cutting advantages.

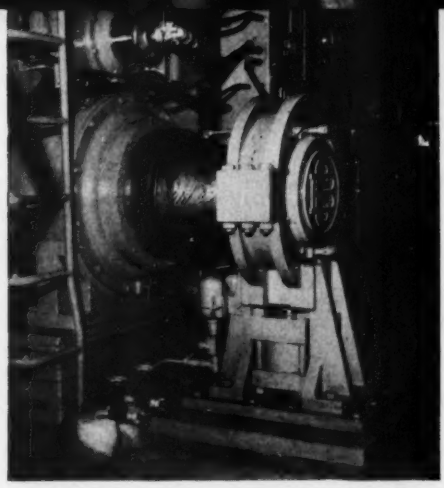
- No regrinding of roll crown when changing number of nips or loading.
- Only one bottom roll crown.
- Crown corrections made at console while calender is running.
- All corrections made at one place . . . the bottom nip.

* Trade Mark

For more data circle 118 on Post Card



Drive side load cylinder and bearing



Load cylinder and bearing . . . tending side

Here's How it Works — Bottom roll journals are extended beyond main roll bearings. A load bearing is mounted on each journal outside the main roll bearing and connected to floor mounted hydraulic cylinders. Individually controlled, they load the journals *up* or *down* thereby changing the amount of crown across the top of the roll. Get all the facts on this important new development and learn how Accra-Nip control can reduce your operating costs. Contact The Black-Clawson Company Paper Machine Division, Watertown, N. Y., today.

PAPER MACHINE DIVISION
Watertown, New York
ANOTHER ADVANCED ENGINEERING DESIGN

BLACK-CLAWSON

For more data circle 118 on Post Card

NEWS OF THE INDUSTRY

Continued from page 709

Albany's Felt Plant in Mexico

Operation is now well underway at the new $2,000,000 plant near Mexico City. This plant, known as Albany-Nordiska de Mexico S.A. de C.V., is a joint venture of Albany Felt Co. of Albany, N.Y., and Nordiska Maskinfilt Aktiebolaget of Halmstad, Sweden. Albany is the major investor.

The new plant, which will make felts in size and quantity to meet any foreseeable needs of the Latin American trade, is equipped with modern machines from the United States, Canada, Sweden, Switzerland, West Germany and Mexico. All manufacturing processes from the selection and inspection of raw wool, through scouring, blending, spinning, weaving, joining, fulling and other finishing operations, will be handled at the mill.

Key personnel posts in the plant are as follows J. Spencer Standish, who is vice president of Albany's foreign operations and also executive vice president of Albany's Cowansville, Quebec, plant, will have over-all direction of the new plant. Ralph B. Wood will become treasurer and general manager; Robert G. Hitchcock, a former superintendent at Albany, will become superintendent of manufacturing operations. Other mill personnel are being recruited from Mexican towns and cities surrounding the plant area.

NO Hard or Soft Spots at the Winder with . . .

RMF hydroscillators

This simple, compact oscillating unit provides a constant horizontal shifting motion while the sheet is being wound into a roll. This back and forth movement prevents wrinkles from "tracking" and building up throughout the roll. No more wrinkles, no more hard and soft spots!

Check your finishing room...our RMF Hydroscillators will give you a higher percentage of salable paper. For more information send for Bulletin No. 101.

ROSS MIDWEST FULTON
A Division of Midland-Ross Corporation
Box 846, Dayton, Ohio

For more data circle 119 on Post Card

Plastic Binding Speeds Paperwork

Mead Corp. of Dayton, Ohio, has established a special department to print and bind the company's internal memoranda, reports and catalogs. Many of the reports, etc., received by the company's 50 branch offices, arrive a day or two prior to an executive meeting. Because the company considers this information essential for its executive conferences, it was impractical to send it out for printing and binding.

The department has installed photo-offset master equipment, a multilith printing machine, collating equipment, and electric punching and binding equipment which is manufactured by General Binding Corp. of Northbrook, Ill. As many as 75 copies of the financial report, which sometimes contains as many as 125 pages, can be printed and secured in plastic-bound books within hours. This new system, according to the supervisor of the printing and binding department, has saved a substantial amount of money as well as time.

A touch of the foot pedal operates the machine, producing a standard pattern of rectangular holes near the edge of the paper.

License Granted to Sandy Hill For Clupak Machinery

Clupak Inc. of New York, N.Y., has granted a license to Sandy Hill Iron & Brass Works of Hudson Falls, N.Y., to make the machinery for pro-

ducing Clupak extensible paper.

Sandy Hill is the second American company licensed by Clupak to produce such machinery. Beloit Iron Works of Wisconsin has already completed 13 extensible paper units and is working on two others.

New Subsidiary — Jagenberg USA Inc.

Beginning January 1, 1961, all the sales and service activities of Jagenberg equipment not covered by special licenses are being taken over by a newly formed subsidiary to be known as Jagenberg USA Inc. The new company will be wholly owned by its parent organization — Jagenberg-Werke A.G. of Duesseldorf, West Germany, manufacturers of sheet cutters, winders, slitters, coating machines, box making, labeling and packaging equipment for paper mills and converters.

The new company has taken over the distribution and service functions for Jagenberg equipment hitherto carried out by American Paper & Pulp Co. Inc. of New York City.

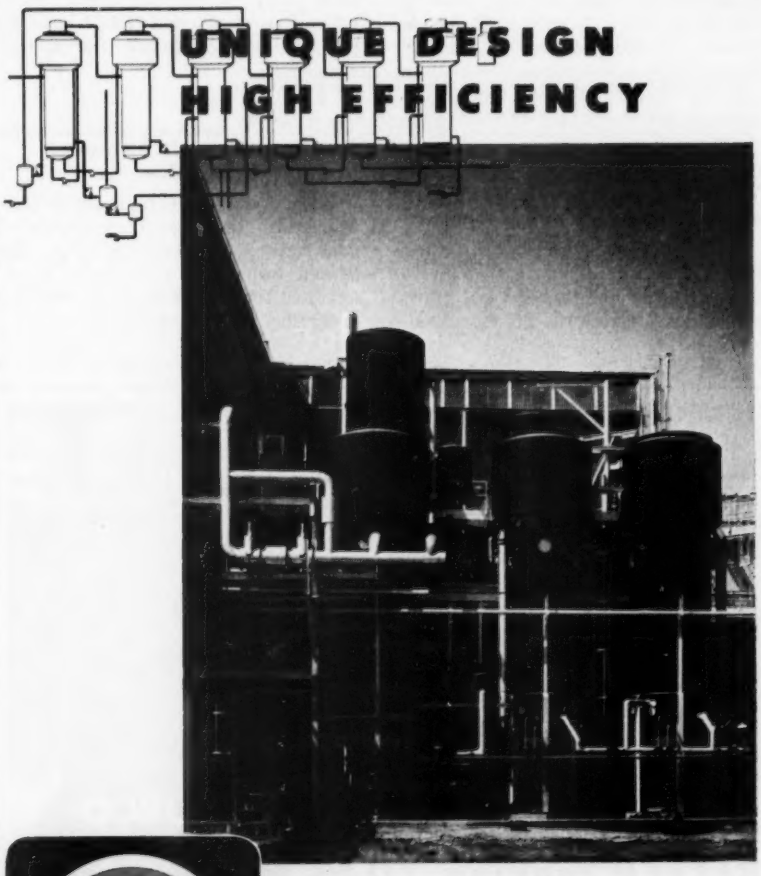
Fisher Governor expands to Mexico

Fisher Governor Co., Marshalltown, Iowa, has announced that the company's line of controls will soon be manufactured in Mexico. The arrangements were made with a group of Mexican citizens in Monterrey, Mexico, to manufacture the complete line of Fisher automatic controls under the corporate name of Controles Automaticos, S.A. All products will be in exact accordance with the standards and specifications of all Fisher controls. All parts of the new products to be manufactured in Mexico will be interchangeable with Fisher controllers now installed in that country. It is expected that the new plant will start installing machinery and operating equipment shortly after the first of the year and be in production as soon as possible.

Olin Mathieson to Build New Wood Preparation Plant

The Sandwell International Inc., consulting engineers of Portland, Ore., has been engaged by Olin Mathieson Chemical Corp. to provide engineering services for a new wood preparation plant at its West Monroe, La., pulp and paper mill.

A complete new wood breakdown plant including two 12-ft. dia. by 67-ft., 6-in.-long drum barkers, two 100-in. chippers and pneumatic conveying of pulpwood chips and bark will be



GB

BLACK LIQUOR EVAPORATOR at NEW SOUTHERN PAPER MILL

This six body, sextuple effect evaporator system was installed in a U-shaped arrangement and was designed to concentrate 428,000 lbs. of black liquor from 14 per cent to 50 per cent solids content, when supplied with 56,000 lbs. per hour of 45 psi steam. The high efficiency of this system (5.52 lbs. of water per pound of steam) was made possible through a new and novel feed arrangement into the evaporators. The first effect evaporator is equipped with 2 inch diameter stainless steel tubes while the other five have welded seam carbon steel tubes.

For more detailed information write for bulletin #PP 509-1

GB

GOSLIN-BIRMINGHAM
MANUFACTURING CO., INC.
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FILTERS / EVAPORATORS / PROCESS EQUIPMENT
CONTRACT MANUFACTURING
including HEAVY CASTINGS

For more data circle 120 on Post Card

installed. The West Monroe plant is said to be the first pulp mill outside western North America to change from pulpwood storage in log form to large outdoor chip storage such as is commonly used in the Pacific Northwest.

Walmsley Group to build extensible paper machinery

The Walmsley (Bury) Group Ltd., Bury, Lancashire, Eng., have been licensed by Clupak Inc. to build the machinery for making Clupak extensible paper. Walmsley's is the fourth machinery company licensed by Clupak to build and install this machinery.

Bowen Industrial Equipment appointed Conoflow Agent

Bowen Industrial Equipment Ltd., Montreal, Que., has been appointed sales agency for Conoflow Corp. The Bowen firm will be exclusive representative for Conoflow in the province of Quebec and eastern Ontario.

Coming Events

TAPPI

February 19-23 — 46th Annual Meeting, Commodore Hotel, New York, N.Y.
March 16 — Graphic Arts, Inman's Restaurant, Galesburg, Mich.
April 6 — Visit Michigan Carton, Inman's Galesburg, Mich.
May 10-12 — Pulp and Paper Instrumentation Symposium, Northland Hotel, Green Bay, Wis.
May 25 — Recognition Night, (with PIMA), Gull Harbor, Richland, Mich.

PIMA

March 16 — Joint Meeting with Craftsmen, Inman's Restaurant, Galesburg, Mich.
April 21 — New York,-Canadian Division, Eastman Kodak Co., Kodak Park, Rochester, N.Y.
April 22 — Ladies' Night,-Hotel Harris, Kalamazoo, Mich.
May 4 — Pacific Coast Division, Harrison Hot Springs Hotel, Harrison Hot Springs, B.C., Canada.
May 11-13 — Pennsylvania-New Jersey-Delaware Division, Yorktowne Hotel, York, Pa.
May 25 — Recognition Night (with TAPPI), Gull Harbor Inn, Richland, Mich.
June 7-9 — National Meeting, Hotel Robert Meyer, Jacksonville, Fla.

OTHER MEETINGS

February 20-24 — APA 1961 Annual Meeting, Waldorf Astoria, New York, N.Y.
February 20-24 — APPA 1961 Annual Meeting, Waldorf Astoria, New York, N.Y.
March 11-15 — 48th Annual Convention of the National Association of Secondary Material Industries, San Francisco, Calif.
March 20-22 — Folding Paper Box Association of America Annual Meeting, Drake Hotel, Chicago, Ill.
March 21-23 — American Power Conference, Sherman Hotel, Chicago, Ill.
March 27-29 — 15th Anniversary of the Advertising Essentials and National Sales Aids Show, Hotel Biltmore, New York, N.Y.
March 27-31 — Symposium on Temperature, Columbus, O.
March 31 — Joint Meeting for Packaging Institute and National Paper Box, Sheraton Hotel, Philadelphia, Pa.
May 1-5 — 1961 Conference of the American Society of Training Directors, Bellevue-Stratford Hotel, Philadelphia, Pa.
May 9-11 — Trade Show and Technical Conference, Material Handling Institute Inc., Philadelphia Trade and Convention Center, Philadelphia, Pa.
May 22-25 — Design Engineering Show, Cobo Hall, Detroit, Mich.
May 28-June 1 — Annual Convention of the Special Libraries Association, Sheraton-Palace Hotel, San Francisco, Calif.

BETTER CHIPS means BETTER cooking YIELD

- MADE IN DISC DIAMETERS FROM 36" TO 153".
- COMPACT, MURCO ROUND LOG PULPWOOD CHIPPERS REQUIRE LESS FLOOR SPACE.

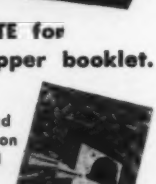
MURCO Round Log Pulpwood Chippers are designed to include the most desirable features for today's production requirements . . . the result of long and careful study of the various features that contribute to outstanding chipper performance in producing more and better chips at less cost . . . less sawdust, fewer slivers, freedom from repairs yet at the same time having production records of 100 cords or more per hour. The MURCO heavy design construction reduces vibration.

All backed by years of constant development so that each year results in an improved chipper design, the latest of which is MURCO UNI-CHIP that produces more uniform chips with less bruising.

MURCO UNI-CHIP is furnished "when specified" on all new MURCO Chippers — or your present MURCO Chipper can be adapted to it.

MURCO ROUND LOG PULPWOOD CHIPPERS

WRITE for MURCO Chipper booklet.



A complete and detailed story on pulpwood and wastewood chippers . . . specifications of each model . . . yours upon request. Write for it today.

D. J. MURRAY MANUFACTURING CO.
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Georgia-Pacific Corp.

Stanton Allen has been appointed general manager of the new corrugated box plant now under construction at Lacey, Wash. Allen has served as a management consultant in general box plant operations for several other paper companies.

S. Allen

M. Romano

C. G. Franke

E. Bogest

Standard Packaging Corp.

C. G. Francke has been appointed division manager of the corporation's Gebhart Folding Box Division and will make his headquarters at the plants offices in Dayton, O. Francke joined the company in 1960 and previously was vice president of Old Dominion Folding Box Division of Weyerhaeuser Co. and president of Franklin Folding Box Co. of Chicago, Ill.

Michael R. Romano has been promoted to division manager. He has been with the company since 1953.

Edward J. Bogest has been promoted to division sales manager. He joined the General Felt Liner Division in 1958. Both Romano and Bogest will be located at the office of the Brooklyn, N.Y. plant.

Darling & Co.

Nelson Morris II has been elected president of Darling & Co., Chicago, Ill. He succeeds William H. McCausland who has become chairman of the board.

Packaging Corp. of America

F. O. Kanehl, a vice president and treasurer of the former Ohio Boxboard Co., and a financial executive of Packaging Corp. of America, Evanston, Ill., has announced his retirement from executive duties. Kanehl joined Ohio Boxboard in 1940.

Robert J. Karlen has been appointed assistant director of traffic and transportation of the company. Karlen formerly was traffic manager of the eastern region. In his new post, he will be located in Chicago, Ill.

L. B. Pitts

P. Wojtul

Continental Can Co.

Peter P. Wojtul has been named general manager of the boxboard, folding carton and fibre drum operation of Continental Can Co., New York, N.Y. Wojtul, a vice president of the company, was formerly general manager of the Fibre Drum & Corrugated Box Division.

Lewis B. Pitts has been appointed general manager of the newly created Corrugated Container Division. Pitts was formerly northeast manager of the Fibre Drum & Corrugated Box Division.

Central State Paper & Bag Co.

Elmer D. Abramson was elected president of Central States Paper and Bag Co., St. Louis, Mo. Abramson was formerly executive vice-president.

J. Bainbridge Jr.

Dr. Bashford Jr.

Penick & Ford. Ltd.

Dr Raymond I. Bashford Jr. has been appointed manager of technical sales service and field development, Paper Division, Cedar Rapids, Iowa. Until recently, Bashford was located at Dayton, Ohio, as papermill representative in the Central District, for Penick & Ford. Ltd.

John P. Bainbridge Jr. has been appointed district sales manager of the New England area. Bainbridge was formerly assistant service manager at Cedar Rapids, Iowa. He previously was associated with Monsanto Chemical Co.

Oxford Paper Co.

Willis G. Hartford, production manager of the Lawrence, Mass., division, has been promoted to mill manager.

George E. Prentiss, general superintendent of papermaking at Rumford, Me., is being promoted to the job of production manager at Lawrence to succeed Hartford.

Chester N. Stupp, district sales manager, has been transferred to West Carrollton, Ohio, where he has become mill manager.

John C. Bloom, assistant supervisor, North Division, Uncoated Mill, Rumford, has been promoted to staff assistant, manufacturing, along with William B. Hanson. They will be located at the New York office.

Sonoco Products Co.

John A. Reagan, Jr., has been appointed public relations manager of Sonoco Products Co., Hartsville, S. C. Reagen will continue in his duties as advertising manager. He has been with

Sonoco for 17 years.

Donald D. Dunham was named to the newly created position of assistant advertising and public relations manager. Dunham was employee communications editor for the Dayco Corp., Dayton, Ohio.

Brown Co.

Walter A. Littlefield, assistant to the director of research and development at Brown Co., Berlin, N.H., has announced his decision to retire. Littlefield is widely known in the pulp and paper industry where he was chairman of the Technical Committee of the Tissue Association for 20 years. He has been associated with Brown Co. since 1929.

Everett H. Pixley has been elected to the board of directors of the Brown Co., Berlin, N.H. Pixley fills a vacancy on the board created last year when S. W. Skowbo, senior vice president and treasurer, resigned.

John W. Bolton & Sons Inc.

F. Richard Convey, general sales manager of John W. Bolton & Sons Inc. and the Emerson Mfg. Co., Division, Lawrence, Mass., has been given the added responsibilities of directing sales for the Bolton Machine Knife Division.

Conoflow Corp.

J. Robert Simpson, general sales manager of Conoflow Corp., Philadelphia, Pa., has been elected a vice president. Simpson has been active in the process control field for eighteen years.

Charles W. Arnold has been appointed a sales engineer for Conoflow's Philadelphia district office. Before joining the sales staff, Arnold was manager of the company's quotations department.

Nekoosa-Edwards Paper Co.

Arthur A. Bernhardt was advanced to the position of assistant production manager, Wisconsin mills. He will direct the activities of the managers of the firms two Wisconsin mills and the manager of the production scheduling department.

Patrick J. Hassett is replacing Bernhardt as manager of the Nekoosa mill.

John S. Buchanan was named acting superintendent of the kraft mill at Nekoosa.

Philip Zieman was promoted to general foreman of the kraft mill.

Alfred Lamb was promoted to tour supervisor in the Nekoosa kraft mill.

Frank H. Newman was named assistant sulfite mill superintendent at the Port Edwards, Wis., mill.

Nicolet Paper Corp.

Frank X. Kreiling has been named vice president and general manager of Nicolet Paper Corp., West De Pere, Wis. Kreiling formerly was with Georgia-Pacific Paper Co., Toledo, Ore., and Thilmany Pulp and Paper Co., Kaukauna, Wis.

F. Kreiling

W. S. Wood

E. Neese Jr.

J. R. Walsh

Beloit Iron Works

W. S. Wood has been elected chairman of the board of Beloit Eastern Corp., Dowingtown, Pa.

E. H. Neese Jr. has been elected president and general manager of the company plant in Downington.

John R. Walsh, formerly vice president and general manager at Downington, has been appointed vice president and general manager of Beloit Iron Works, Beloit, Wis.

Consolidated Water Power & Paper Co.

William P. Orcutt has been appointed technical supervisor at Wisconsin Rapids, Wis., for Consolidated Water Power & Paper Co. Orcutt has been serving as a project engineer on the company's research and development staff since 1957.

H. M. Hughson has been appointed to the position of production manager of pulp and paper at the Biron Division of the company. Hughson has been heading this division's technical department since 1959.

Allied Paper Corp.

Jack Gilman has been appointed vice-president in charge of manufacturing for Allied Paper Corp., Kalamazoo, Mich. Gilman will direct and co-ordinate all manufacturing functions of the King, Bryant Book, Bryant Coating, King Photographic and Monarch Mill divisions in Kalamazoo.

Clayton Russell has been named director of quality control of the company. Russell will assume overall direction of the quality control for the King, Monarch and Bryant Mill divisions.

Great Northern Paper Co.

Donald G. Griffee has been appointed process engineer for Great Northern Paper Co., Millinocket, Me. In this position he will conduct a study of the company's sulfite mills. Griffee was formerly resident manager of Standard Packaging Corp.'s Lincoln, Me., mill.

Albany Felt Co.

William LaMore, Charles Sedgwick and Charles Saimond have been named to the consulting posts, and will be responsible for the solution of technical problems in felt manufacturing and the investigation of new machinery.

Thurso Pulp & Paper Co.

Clyde S. Reynolds has been elected president of Thurso Pulp & Paper Co., Thurso, Que. He succeeds Paul B. Bourget. Reynolds has been with the company serving in the capacity of vice-president and general manager since 1958.

Packaging Materials Corp.

Thomas H. McConnell Jr., was appointed president of Packaging Materials Corp., New York, N.Y. He succeeds C. E. Carpenter, who has resigned to devote full time to other business activities.

Kimberly-Clark Corp.

Milton J. Gordon, formerly manager of Columbia mill, is now production manager of the company's Lee, Mass., mills.

Eugene R. Klos, assistant Columbia mill manager, will become senior project engineer for all Lee mills.

Frederick C. Hartwell will succeed Gordon as manager of the Columbia

(Continued on page 824)

DuBois Chemicals

SETS THE PACE WITH CUSTOMERIZED FELT CLEANING SERVICE

A NEW WAY TO HELP SOLVE THE 1961 PROFIT SQUEEZE

COMPLETE SURVEY, WEIGHT REDUCTION POROSITY TESTS AND EXTRACTION + SPECTROPHOTOMETRIC STUDIES FOR UNKNOWN RESIDUAL COAGULANTS = the right compound for increased machine efficiency

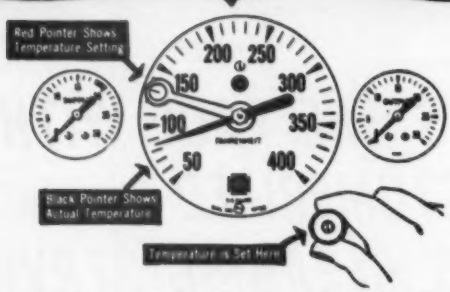
DuBois technical advisory service, with its wealth of knowledge, will work with your chemical laboratory to develop the correct felt cleaning formulas for increasing mill production and increased profit margins. Results have shown mills can save up to $12,000 per machine per year by using the right formulation with automated procedures. Consult us now. Write: Paper Mill Division, DuBois Chemicals, Inc., Broadway at 7th, Cincinnati 2, for complete data.

Photo courtesy of The Perkin-Elmer Corp., Norwalk, Conn.

DUBOIS CHEMICALS, INC., CINCINNATI 2, OHIO

For more data circle 122 on Post Card

New wet end dryer control improves finish . . . helps stop picking, curling, cockling on all types of paper



Picking, curling and cockling of paper or board usually means one thing—poor temperature control on the first few wet end dryers.

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FOREIGN ABSTRACTS

Measurements at the dry end of the paper machine

The author discusses problems which deal with heat transmission and temperature changes that occur in the drying of the paper web by means of steam heated dryers. Various methods used in making such measurements, and the most appropriate sites for introducing measuring instruments, were explored. In theory it appears better to control the steam consumption of individual

Fig. 1

cylinders than to control steam pressure, but such controls are seldom resorted to in practice, because of cost, and because the areas in which it would be best to make measurements are unfavorably placed. With the advent of modern instrumentation, the accuracy of measuring surface temperatures at the dry end of the machine has greatly improved, and measurements of this type are now made more frequently. In order to control paper quality adequately, the continuous determination of basis weight and the dry content of the sheet at the dry end, is important. A critical study was also made of the problems and the difficulties found in determining such basis weights by the use of radiation instruments. Figure 1 shows a pyrometer (Thermo-element) used in measuring the surface of a drying cylinder, which is then connected with a measuring device ("Messgerät") not shown in the sketch.

Five references. Friedrich Linde. *Das Papier* 14, 453-57 (1960) (In German, with English summary).

Stabilization of glucomannan in pulping

Part of softwood glucomannan became resistant to hydrolysis in the sulfite process, provided the cook was preceded by a long impregnation period at low temperatures, or by a slightly alkaline precook. This was not true if this precook was carried out under acidic conditions. The authors assume that this increased resistance of the glucomannan is due to an increased degree of lateral order by the adsorption of the glucomannan on the wood cellulose. It was shown that fragments of the glucomannan occur in the cooking acid during the impregnation period and that they can be adsorbed on cotton linters. Eventually the latter become "saturated" with the glucomannan. Experiments indicated that, irrespective of the pH of the precook, little adsorbable glucomannan fragmentation occurred during the subsequent digestions; also there were only slight differences in the lignin reactions. It was also shown that the carbohydrate composition of the wood residues after the first stage (impregnation or mild alkaline cook) was nearly the same irrespective of the initial pH. However, as soon as the acid cooking conditions were obtained, the glucomannan content of woods that had received an alkaline pretreatment was higher than in woods that had not received this treatment. The stabilized glucomannan amounted to about 4 per cent of the weight of the wood.

The reactions resulting in the adsorption-stabilization of the glucomannan after a precook at pH 8 were studied further. Presence of sulfites or bisulfites in the precook appeared to be immaterial, and apparently lignin reactions are not involved. An investigation of the kinetics of the precook, as gaged by the resistance of the glucomannans to hydrolysis (in the subsequent stages) showed that the reaction (on the alkaline side) was a

rather rapid one. It is suggested that ester bonds undergo cleavage before the glucomannan stabilization can occur. This stabilization reaction appears to be concomitant with wood deacetylation. Such ester bonds may be due to acetyl groups, but they may also be due to bonds linking glucuronoxylan to glucomannans in the wood. When such bonds are broken, this must have an effect on the strength properties of the pulp. This was demonstrated in comparing bisulfite pulps with two-stage neutral sulfite-bisulfite pulps.

17 references; 7 tables, and twelve figures. G. E. Annergren and S. A. Rydholm. *Svensk Papperstidn.* 63, 591-600 (1960) (In English).

Shredding of alkali-cellulose

The authors studied the effects of shredding alkali cellulose in a viscose pilot plant operation. When this was carried out in a continuous high speed laboratory disc-shredder of the Werner-Pfleiderer type, deterioration resulted and the viscose formed subsequently showed poor filterability (high K_w). When the same type of alkali cellulose was shredded in a paddle-shredder

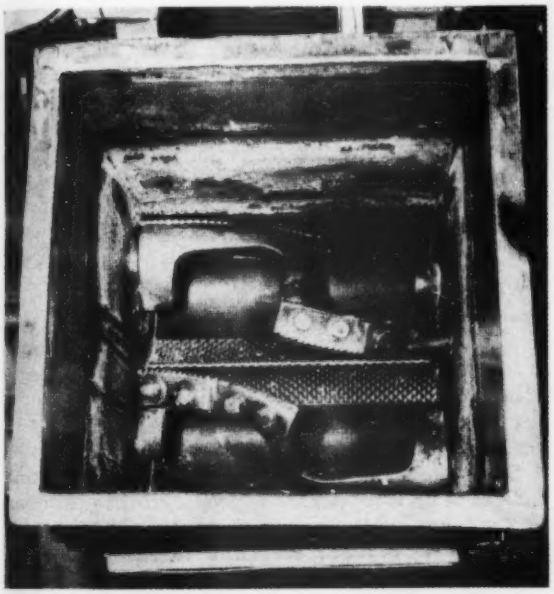


Fig. 2

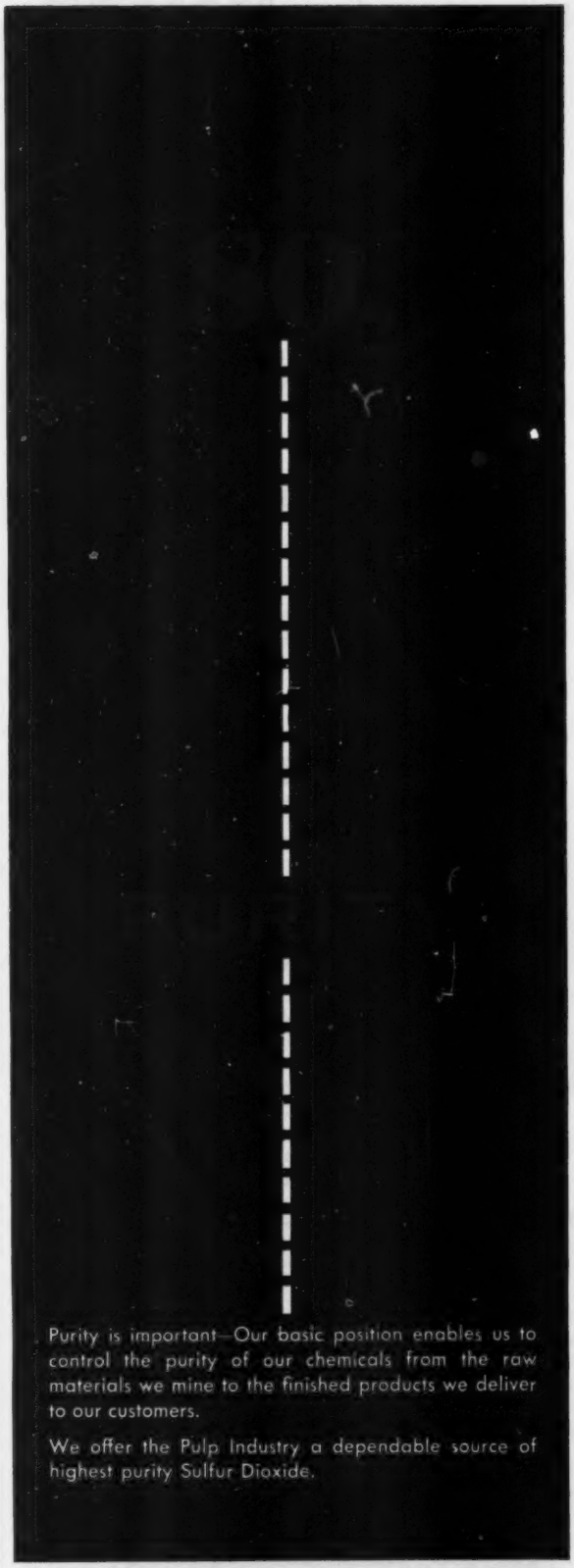
(cf Fig. 2), much of this difficulty was avoided, and it is evident that continuous shredders should not be used in laboratory examinations of this type.

Regardless of the kind of pulp examined, the content of solvent extractives proved to be a major factor in the magnitude of deterioration noted in the continuous shredder. In the case of a prehydrolyzed kraft pulp, which then had a low solvent extractive, the filterability value (K_w) increased twenty-fold over that obtained when a paddle-shredder was used. A Super I-sulfite pulp, similarly processed by the two methods, showed a tenfold increase. When a suitable additive (e.g. "Berocel 25") was added to the kraft pulp, the K_w increase was only about twofold. An improvement in filterability was also noted when the lye used, contained 40 g. per liter of hemicelluloses. The authors warn that in previous studies in which continuous shredders were used, the results should be critically reevaluated. Such investigations may have led to misleading conclusions.

Sixty-two references, many of them dealing with wood extractives. Nils Hartler and Erik Ringström. *Svensk Papperstid,* 63, 641-51 (1960) (In English).

Lignin in the outer bark of Japanese oak

This is the seventh of a series of chemical studies on bark. The lignin in *Quercus crispula* (Japanese oak) is made up of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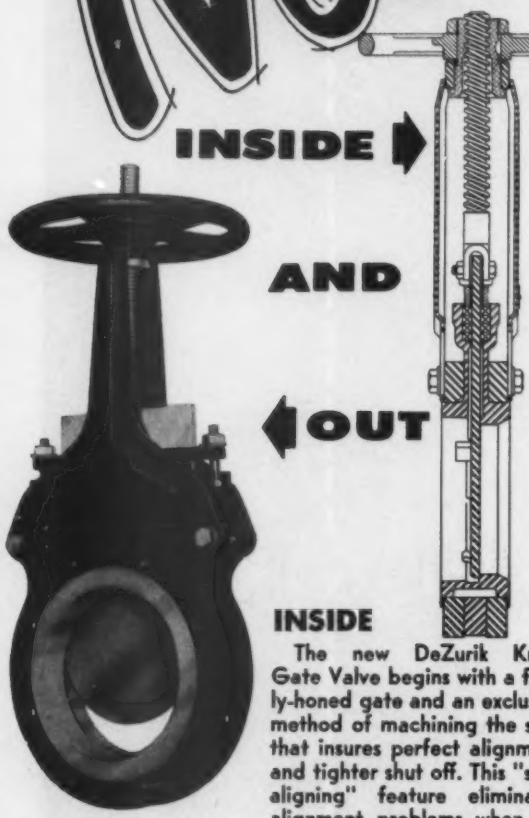

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three fractions: a phenolic acid (readily extracted by hot dilute alkali), a dioxane lignin (soluble in dioxane containing hydrogen chloride), and the residue after such treatments. The latter appears to be quite similar to the lignin of the wood. The dioxane lignin also resembles wood lignin in many of its properties, and the phenolic acid fraction has characteristics that appear to be intermediate between those of wood lignin and tannin or phlobaphene. Infra-red and ultraviolet spectra are given of all the above components, and the nitrobenzene oxidation products of the three fractions are also given.

K. Hata and M. Sogo. *J. Japan. Wood Research Soc.* 6, No. 2, 71-5 (April 1960) (original in English with Japanese summary); through *Abstr. Bull. Inst. Paper Chem.* 31, 251 (1960)

Rapid construction of a paperboard plant

The author who is head of the department of general installations of the "Office Central de Chauffe Rationelle", describes briefly the efficient and rapid erection of this plant under the general guidance of the "Bureau d'Etudes", (an engineering study bureau). From early in May 1959, when the ground was broken throughout the construction period, and up to the actual installation of plant equipment early in 1960, the author follows graphically

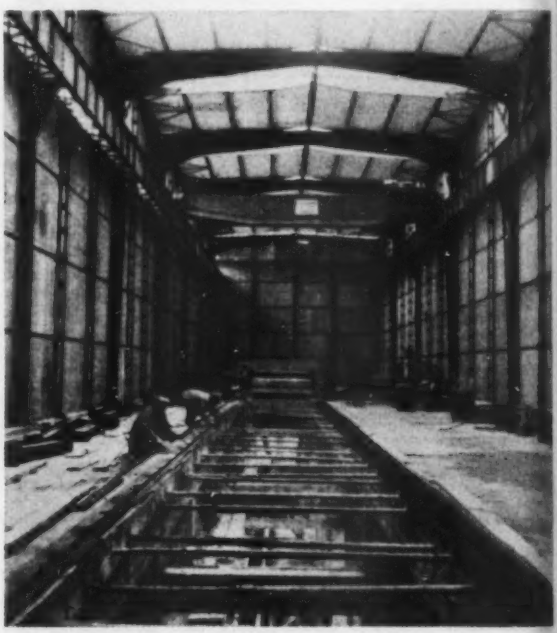

Fig. 3

the functions of engineers and draftsmen, and cites this as an example of what can be achieved by the friendly cooperation of five engineers with the plant manager, and the personnel of the company (Cartonneries de Pont-sur-Seine). Actually two structures were erected, the plant proper and the administration building, and emphasis is placed on the speed of erection. An interior view of the partially constructed factory is shown in Fig. 3, at the time when metal plates were being laid. Other figures (not shown here) indicate various stages in the construction of the plant. A brief description is also given of raw materials, machinery and operations.

M. Destribats. *Papeterie 82*, No 11,775,777,779,785 and 787 (1960) (In French).

Rapid lignin determinations

Lignin was determined in the sawdust from pine, spruce, birch, larch, fir, and oak, and in ground cotton hulls, sunflower hulls and in ground cornstalks. A 0.5 gr. sample (weighed to the nearest milligram) was allowed to swell in 3 ml. of pure pyridine and then treated with 40 ml. 78 per cent sulfuric acid and ground in a

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mortar for 15 minutes. The mixture was then poured into 180 ml. of water at 80° C., and refluxed for 5 minutes, filtered through fritted glass, washed free of sulfate ions, dried and weighed. Values obtained by this procedure were in good agreement with those found by the König-Komarov method in all cases excepting the cornstalks. Here the K-K method gave higher lignin values. This is explained on the basis of humification in the older procedure, which in the case of cornstalks leads to high values.

Five references. M. G. Okun, S. I. Sukhanovskii, M. I. Chudakov and A. P. Krasnova. *Gidrolz i Lesokhim Prom.* 12, No 5, 10-11 (1959) (Original in Russian) through *Abstr. Bull. Inst. Paper Chem.* 31, No 4, 538 (1960).

Finnish production of machinery for the paper industry

Wärtsilä, which has eleven plants, is Finland's largest engineering enterprise, and of its companies, Maskin och Bro, located in Helsinki has specialized in machinery for the pulp and paper industry. At the close of the last century it made a small beginning by producing kraft pulp digesters for Finnish mills. In 1920, their production included digesters, diffusers, acid tanks, chippers, chip

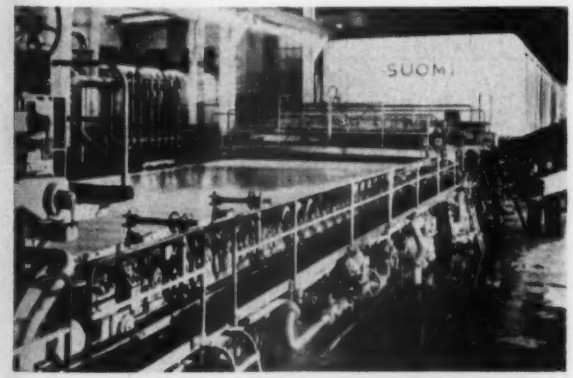

Fig. 4

screens, deckers, flat screens and bale presses, followed by the construction of wet machines and pulp drying equipment. The number of items has grown, so that at present, high speed papermachines are included, and a number have been supplied to members of the Soviet block (including a newsprint machine sent to China). Lately however paper machines have also been supplied to Pakistan, Switzerland, Brazil and France. In Finland itself a newsprint machine capable of 3000 feet per minute has been ordered. About 62 barking drums have been made or ordered, and many of these have gone to such countries as Sweden, Italy, New Zealand, Spain, the U.S.S.R. *et al.* Furthermore these drums have been built on license in Austria and Germany. This gives only a partial review of some of the results achieved by Wärtsilä, and many of the items are not mentioned here. Fig. 4 shows the newsprint papermachine supplied to a mill in Switzerland.

Anon. *Finnish Paper and Timber* 10, No 7, 102-104 (1960) (In English).

Saccharinic acid formation due to alkaline degradation of cellulose

Inasmuch as in alkaline pulping, the saccharinic acids are found in the final black liquors, the results of the following fundamental studies, carried out in the laboratories of the British Rayon Research Association are of interest. They deal with the mechanism of saccharinic acid formation, and are included in 4 papers, one of which is abstracted here.

In the degradation of 4-0-methyl-D-glucose, maltose, amylose and cellulose, calcium hydroxide favored the formation of D-gluco-iso-saccharinic acid *(1)*. On the other hand in sodium hydroxide, fragmentation occurred and in certain cases α,β-dihydroxybutyric acid and glycollic acid predominated. These may have arisen for an α,β-diketone which is postulated as a precursor of *I.* Greville Machell and G. N. Roberts.

J. Chem. Soc. 1960, 1924-31; through the *Abstr. Bull. Inst. Paper Chem.* 30,1536 (1960).

Reagents used in slime control

This is a brief account of laboratory studies, as well as a few experiments made on white water and paper. The efficacy of various commercial slimicides were made on a laboratory scale, using three (unlisted) resistant microorganisms isolated from paper mills. Most of the experiments were made with organic mercury compounds (*i.e.* phenylmercuric acetate, and in one instance, diphenylmercuric ammonium propionate "Metasol"), which were highly effective as inhibitors. Some studies were also made of the number of organisms found in the white water by making counts at various times after addition of the slimicide. It was evident that whereas, directly after addition of the reagent, the bacterial count might be practically nil, it increased rapidly due to introduction of more microorganisms in fresh white water. Among others, certain organic tin derivatives ("Mildoline" and "Occatin") were examined in the laboratory, but these required 10,000 parts per million to cause inhibition of the organisms. On the other hand the quinoline derivatives "Oxin" and "Mergal K 98" were highly effective in laboratory tests. Tests were also made with chlorinated phenols, with organic sulfur compounds, and with sodium bisulfite. Some marked limitations in interpreting laboratory studies, and in some cases mill investigations, are outlined. For example, an organic sulfur compound "35-D" was an effective inhibitor in the laboratory and also showed good results as a slimicide in one of the mills. On the other hand, this same reagent was ineffective in lowering bacterial counts in mill water. This paradox is not explained.

Brigitte Hamburger. *Das Papier* 14, 10a, 532-4 (1960) (In German.

Dr. Melvin Nord

Cast Coated Paper

U. S. 2,950,214, issued Aug. 23, 1960 to John W. Smith and assigned to Mead Corp., describes a method of making a cast-surfaced mineral coated paper having unusually high brightness and opacity and high gloss with enhanced affinity for receiving printing.

An aqueous suspension of pigment and adhesive material is applied to the paper, to form a smooth surface coating on the paper. The coated surface of the paper is then brought into contact with an adhesive coagulating electrolyte while the coating is still fluent on the paper, thereby progressively converting the adhesive into a tough deformable gel while maintaining a uniform and smooth surfaced layer of coating. The coated surface of the paper is then brought into contact with a smooth casting surface, and the coating is dried on this casting surface.

Machine for Making Paper Board

U. S. 2,943,677, issued July 5, 1960 to Francis W. J. Leek, provides a machine for making paper board, which avoids the use of a rotating drum and the heavy expenditure of power in driving the drum.

The machine is shown in Figs. 1 and 2. It includes a vat 1 for containing the stocks, a stationary framework or drum 2 located

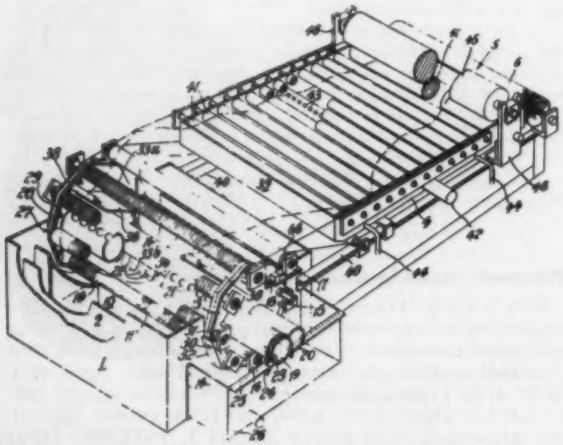

Fig. 1

in the vat and adapted to guide an endless paper forming wire band 3 over an extended tubular path, a suction box 4, a paper making head 5, and a driving roller 6.

Vat 1 is provided with an inlet 7 for stock at one side. Anti-surge baffles 9 are provided in order to obtain a smooth flow of stock through the vat. Arranged within the vat is a trough 10. The stock spills over the upper edges 11 of the trough and fills space 12 between it and the periphery of the framework.

The tubular framework 2 for the paper forming wire 3 is constituted by a pair of spaced apart plates 13 closing the ends of the tubular framework and a number of freely rotatably mounted rollers 14 extending longitudinally between and spaced around the end plates 13 to form the periphery of the framework. The endless wire band 3 is of wire mesh, of a width slightly greater than the spacing between end plates 13, and is guided over rollers 14 around the extended tubular path formed by the periphery of the framework. Thus the side of the framework is substantially enclosed by the wire mesh which forms a perforate wall on it. Wire band 3 further extends over suction box 4 around driving roller 6 and returns to drum 2 via guide roller 65 and reversing roller 66.

Secured in end plates 13 and extending longitudinally of drum 2 are two tubes or pipes 19 and 20. Tube 19 is adapted to be

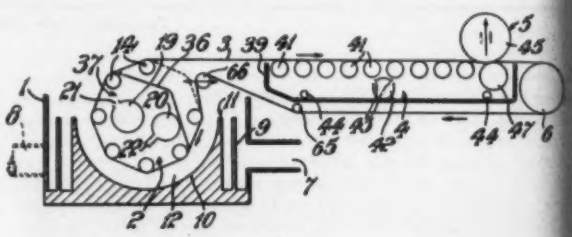

Fig. 2

connected to a source of vacuum (not shown) and is provided with a row of apertures 21 along its length arranged to lie above the level of the stock in the vat. The tube 20 is likewise provided with apertures or outlets 22 along its length but arranged to extend beneath the level of liquid in the drum. Tube 20 is adapted for connection to a pump and serves for removing drainage or white water from the drum to recirculate it to the stock supply (not shown). Since the end plates are stationary, the connection of vacuum and drainage pipes to the interior of the framework is greatly simplified compared with corresponding connections to a rotating wire-covered drum as in previous constructions.

Rollers 14 are each provided with a screw thread or helical groove along its length to assist drainage of water from the stock as it is picked up by band 3 during its passage through vat 1.

Other Patents of Interest

Subject	Inventor or Assignee	Patent No.	Date
Doctor for papermaking machines	Vickerys Ltd.	2,948,012	8/9/60
Continuous digester	Pandia Inc.	2,948,336	"
Pulp molding apparatus	Diamond National Corp.	2,948,337	"
Window carton	Fibreboard Paper Products Corp.	2,948,390	"
Horizontal compartmental nursery box	Crown Zellerbach Corp.	2,948,454	"
Carton	William P. Frankenstein	2,948,455	"
Snap lock closure for a rectangular container	Crown Zellerbach Corp.	2,948,456	"
Bag for flour	Edward G. Thiele	2,948,457	"
Wet strength paper	American Cyanamid Co.	2,948,652	"
Papermakers' felts	Scapa Dryers Ltd.	2,949,134	8/16/60
Blank for truncated conical cups	Dixie Cup Co.	2,949,216	"
One piece carton and sipper straw holder	William A. Pugh, Sr.	2,949,217	"
Display and collapsible cartons	Package Machinery Co.	2,949,218	"
Cartons	William P. Frankenstein	2,949,219	"
Cartons	David Levkoff et al	2,949,220	"
Cartons	KVP Sutherland Paper Co.	2,949,221-2	"
File and mail envelope	George E. Eichenlaub	2,949,223	"
Sequin impregnated paper	Charles C. Bolyard	2,494,398	"
Neutralizing lignin-containing liquors	Firma Aschaffenburger Zellstoffwerke A. G.	2,949,448	"
Manufacture of box blanks from box board	Alton Box Board Co.	2,949,827	8/23/60
Crinkled paper product	Richard H. Wikle	2,949,954	"
Lined carton	Pneumatic Scale Corp.	2,950,036	"
Package for liquid, pasty and pulverulent materials	S. A. Plastus	2,950,037	"
Packing pad	Packaging Corp. of America	2,950,038	"
Tubular receptacle	Owens-Illinois Glass Co.	2,950,039	"

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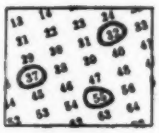

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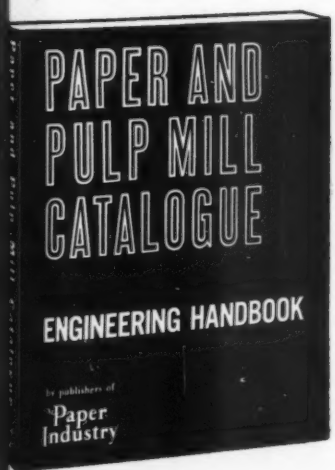

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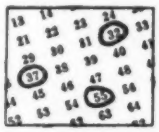

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CONTENTS:

- **Manufacturers Catalogue Section** — contains pages and complete inserts giving information and data on products of individual manufacturers. Pages appear in alphabetical order by names of manufacturers.
- **Buyers Service Section** — includes a comprehensive, cross-reference list of machinery, equipment, materials and chemicals with names of responsible manufacturers and suppliers; a list of trade names; complete addresses of all firms that are listed in the Section; and a directory of educational institutions in the United States and Canada having courses of instruction in the manufacture of pulp and paper.
- **Engineering Handbook Section** — a compilation of practical engineering data, formulas, graphs, charts, tables, etc., including a section dealing with uses and hazards of chemicals used in pulp and paper making. New material added yearly.

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Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.

Horizontal reel

The Surfastart 1000 is designed for speeds up to 1000 fpm and widths up to 100 in. It is equipped with anti-friction bearings, primary arm loading, synchronized secondary slides and retractable secondary slides. *Black-Clawson Co. Inc., Dilts Div.*

Circle No. 1 on Readers' Service Card

Strip reinforcement for containers

Strip reinforcement of corrugated containers increases bursting strength by 60 per cent and puncture resistance by 48 per cent. The added strength results from laminating a strip of reinforcing material between the corrugating medium and the outer liner in the container. *Olin Mathieson Chemical Corp.*

Circle No. 2 on Readers' Service Card

Electronic web-break detector

A newly developed, multiple-function electronic web-break detector that simultaneously scans the web at one, two or three points, signals when a break or peel occurs and cuts off the power automatically on the press or machine. Easily installed on new or existing equipment, the detector operates at any web-speed and is completely automatic. *Machine-O-Matic Inc.*

Circle No. 3 on Readers' Service Card

Caustic soda pump

A reciprocating pump capable of pumping 50 per cent caustic soda is now available. Nickel alloy parts are installed where the caustic soda is contacted. The pump's plungers and valve plates are made of K monel, valve seats of S monel, and the fluid ends are 3½ per cent nickel steel. *Aldrich Pump Co.*

Circle No. 4 on Readers' Service Card

Temperature regulators

A new line of temperature regulators for storage type heating and cooling applications, is named Leslie-Eventemp. The regulators are single seated, self-contained units, with a lever-type internal pilot. They are available with cast iron or bronze bodies, with screwed or flanged ends in a complete range of sizes from ½ to 4 in. Inlet pressures up to 175 psi and temperatures to 500° F., are additional features. Optional features include external impulse connections for low inlet pressures, continuous bleed for cooling service and calibrated dials for quick setting without waiting for equipment to heat. *Leslie Co.*

Circle No. 5 on Readers' Service Card

Infra-red heating

A controllable, flameless, catalytic method of producing low-temperature infra-red heat, is now available. Surface temperature of the catalyst screen can be held automatically at any point between 800° and 1500° F. by proportionate control of the gas flow. The unit is particularly profitable for application in drying paper, and in continuous strip coating operations. *Catalytic Combustion Corp.*

Circle No. 6 on Readers' Service Card

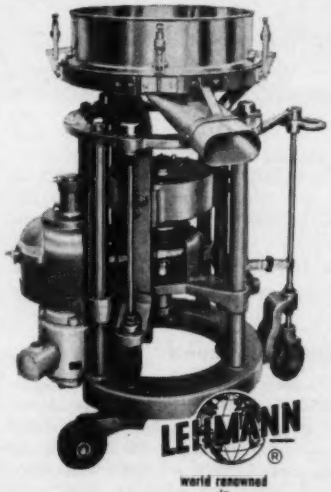
Tensile tester

The Schopper tensile tester is now available with an autographic recorder which records tensile strength and elongation. This equipment with two attachments can perform edge tear tests or wet strength tests. *Testing Machines Inc.*

Circle No. 7 on Readers' Service Card

Rotary sheeters

A new line of rotary sheeters is now available. Pre-Hi sheeters use the principle of straight line cutting from feed rolls to knife with close control of web tension.



The LEHMANN VORTI-SIV

has surprised the

PAPER INDUSTRY

This amazing screening machine never fails to impress paper mill executives who see it at work on: starch, clay and latex coatings; pigment slips; beater starch; tall oil; debarker water; and other materials. Some of the advantages are: use of finer mesh screens, fewer rejects, increased capacities, better product control and generally improved results. The gyratory action of the VORTI-SIV is adjustable both in speed and amplitude of gyration, to suit the material processed. It screens solids, liquids and slurries in meshes from 4 to 400. The screen is practically non-binding.

Write for further information or a demonstration in our plant — or contact the Lehmann distributor nearest you.

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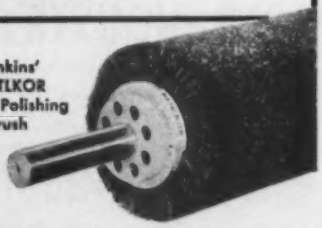
PRIVATE EYES

Jenkins' METLKOR brushes, teamed with Viking's Void Detector, check every inch of paper as it is made, find holes, measure them, count them, record them, pinpoint their positions and signal the operator, all automatically. The Jenkins' feeler brush, a critical part of the system, sends a low voltage pulse to the Viking Indicator Unit whenever a hole appears.

John Glump, Vice-President of Viking Instruments, Inc., of East Haddam, Conn., says: "Jenkins' brushes do a superb job for us. They are an improvement on 13 counts:

1. Improve accuracy of flaw detection.
2. Have no abrasive effect on product.
3. Eliminate lint problem.
4. Outlast previous brushes 3 to 1.
5. Made exactly to size, no cutting or alterations necessary.
6. Simplified mounting.
7. Improved construction.
8. Superior bristles.
9. Refillable when bristle is worn.
10. More economical.
11. Free engineering service.
12. Speedy solution to problem.
13. Quick delivery."

Jenkins' METLKOR Paper Polishing Brush



Jenkins' also makes the following brushes for the paper industry:

Conveyor Cleaning • Blanket Washer • Fourdrinier Wire Cleaning • Polishing • Coating • Dusting • Dampening • Spray • Sleve • Static Elimination • Flocking • Felt Cleaning • Feed or Carrier • Paint Brushes • Floor Sweeps

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For more data circle 128 on Post Card

Designed to run at a speed of 1000 fpm on single as well as multi web, the rotary sheeters are built in standard sizes ranging from 19 to 156 in., and cut off ranges of 8 to 82 in. for single web with electronic scanning device or multi web, as well as cutting to registration. *Smith & Winchester Mfg. Co.*

Circle No. 8 on Readers' Service Card

Packaging machines

Six models of the Kordite packaging machines are now available in combination with a variety of polyethylene film gauges for the manufacture of consumer paper products. The package machine and plastic film combination offers facilities for slit-polyethylene tubing, garment film tubing, and shrinkable polyethylene for skin-tight packaging. *Kordite Co.*

Circle No. 9 on Readers' Service Card

Folding box adhesive

A fast-setting polyvinyl acetate resin adhesive for modern folding box manufacturing operations is called Solu-Rez 54-10301, and is recommended for straight-line folding box work where deep bite and high speed are required. It can be easily cleaned from machine parts and reservoirs with water, and without the need for solvents. *Morningstar-Paisley Inc.*

Circle No. 10 on Readers' Service Card

Worm gear speed reducers

A new line of worm gear speed reducers offers horsepower capacities up to 80 per cent higher with space savings of 50 per cent. The new line is available in nine sizes ranging between 3 and 12 in. center distances. Ratios extend from 4 1/7:1 to 95:1, and ratings from fractional to 175 hp. *Cleveland Worm & Gear Div., Eaton Mfg. Co.*

Circle No. 11 on Readers' Service Card

Sealing compound

A sealing compound is now available which is permanently flexible, waterproof and has strong adhesion. For industrial use, it is applicable for caulking and sealing around tanks, air ducts, water lines, electrical boxes and windows. It is quick setting, white, non-yellowing and easy to use. *Devcon Corp.*

Circle No. 12 on Readers' Service Card

Linear motion potentiometers

A new series of ½ in. dia. linear motion potentiometers developed for flow controls and instrumentation, is available for the paper industry. It is an electro-mechanical device which divides A.C. or D.C. electrical input voltage in accordance with the position of its shaft. The potentiometer can also be used as an instrument transducer for fluid metering and liquid level indicators, and speed, feed, thickness and process gauging controllers on rotary presses. *Markite Corp.*

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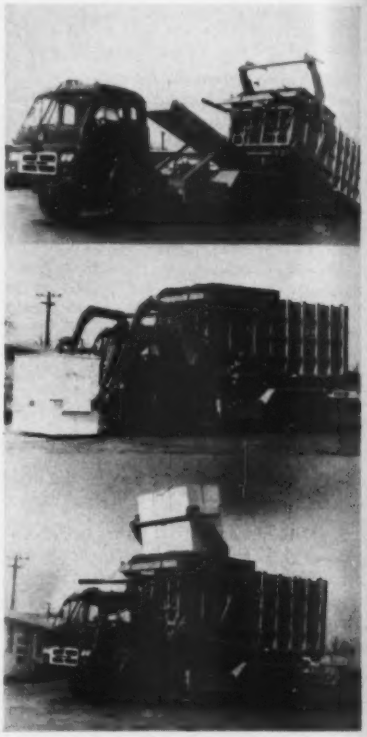

Refuse container handling unit

A new refuse container unit for use with the Dempster-Dinosaur gives the Dinosaur a new versatility to such a degree that it can now serve as a complete system for both heavy materials handling and general refuse collection and disposal for plants. The new development consists of a compaction body and two cab-clearance lifting arms mounted on a standard frame. It can be operated as a self-loading packer when automatically pulled up on the skid frame and locked in place. The new unit is called the "Dinomaster." *Dempster Bros.*

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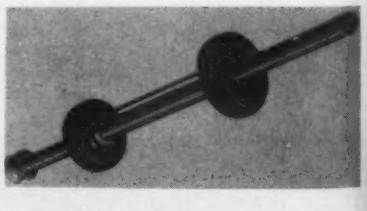
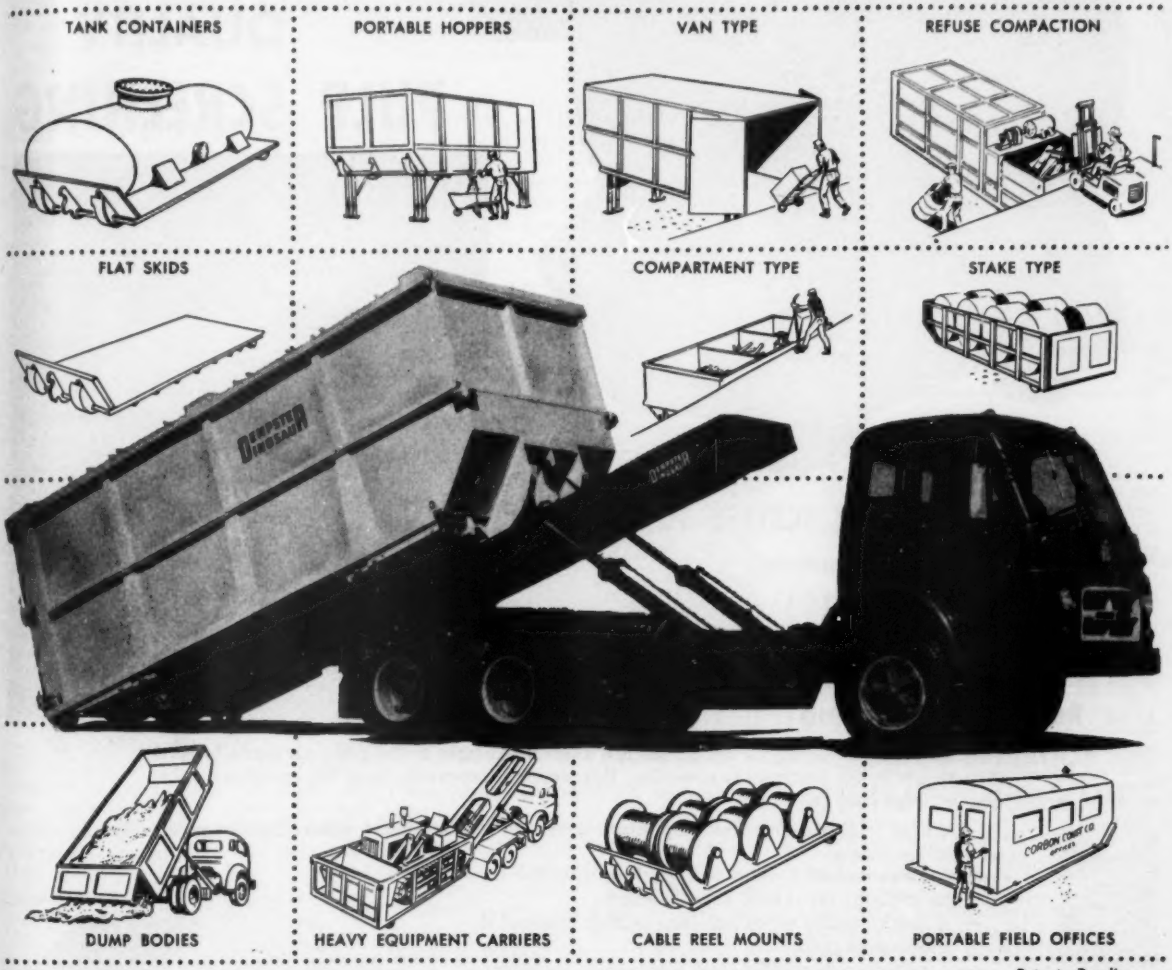


Expanding mandrel

This pneumatic mandrel, used in the winding and unwinding of paper and paperboard rolls, requires an air pressure

Continued on page 817

One DINOSAUR With Detachable Containers Solves Many Complex Materials Handling Problems



Patents Pending

Here's the materials handling tool that takes up where the fork-lift truck leaves off. Gigantic loads can be placed on skids, in tanks or containers. The DEMPSTER-DINOSAUR picks them up . . . automatically . . . in seconds . . . and whisks them to their destination, in-plant or to over-the-road locations. Here they are put down, intact . . . pushed off on a dock . . . left on telescopic legs . . . or dumped.

One truck handles any number of containers of many types. Value of truck is multiplied . . . standing-idle time is eliminated . . . loading and handling is cut to the minimum. One man, the driver, handles the all-hydraulic operations without leaving the cab.

Containers available up to 40 cu. yds. and over . . . loads are limited only by the capacity of the truck. If you have a special problem send it in.

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NEW ADVANCES IN LOW COST QUALITY PULP SCREENING

IMPCO CENTRIFUGAL SCREENS FOR:

Washed Stock Screening
Hot Stock Screening
Sealed Black Liquor Knotting
Fibre Length Classification
Paper Stock Cleaning

The new Impco Centrifugal Pulp Screen is the latest example of the progress made toward the ultimate in low cost quality screening. This screen incorporates many improved principles and features such as:

- — a stock inlet allowing direct top, bottom, front or rear infeeding which simplifies installation piping;
- — a tangential inlet which changes flow direction from linear to rotating, yet retains velocity head;
- — a special stator which provides uniform internal distribution of pulp;
- — a patented high-efficiency rotor which increases capacity without additional horsepower;*
- — a bottom accepted stock outlet permitting all sub-floor piping;
- — a full length quick-opening door for routine accepted stock sampling;
- — an accessible rejects outlet for tailings inspection or sampling.

These features are resulting in peak capacities and high discharge consistencies at lowest horsepowers. Reject richness is readily controlled. Engineered simplicity is characteristic of the entire line of Impco Centrifugal Screens which require very little operating attention and mechanical maintenance.

* U. S. Patent No. 2,845,848.

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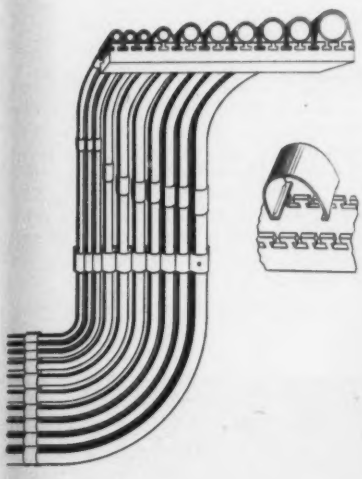
NEW PRODUCTS

Continued from page 814

of 75 psi, and is easily inflated with standard type air chuck. Air unit tires are deflated when the mandrel is inserted into the roll core. When in place, air pressure is applied to inflate the tires, which then grips the inside of the core. Roll slippage is practically eliminated. *Perfection Tool & Mfg. Inc.*

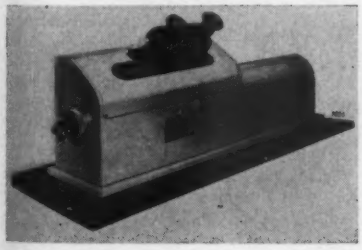
Circle No. 15 on Readers' Service Card



New hanger

A hanger for banks of electrical conduit and pipe features one piece clamps, automatic alignment, interchangeability of pipes within the bank without moving adjacent pipes, and a variety of clamp sizes. The same clamp fits both iron and other pipes. *Stamperhanger Co.*

Circle No. 16 on Readers' Service Card



Web viewer

The new web viewer visually stops and permits inspection of moving materials. This precision optical device provides close-up full-width examination of materials without interrupting production schedules. Although the viewer seems to stop moving materials, the illusion is created by an oscillating mirror system. The viewer may be adjusted to examine patterns of different repeat lengths, and permits careful inspection of colors, structure or register. Materials running at speeds up to 1500 ft. per minute can be examined in 45 in. long sections. *Mount Hope Machine Co. Inc.*

Circle No. 17 on Readers' Service Card

Automatic battery charging

A new automatic control unit now makes charging automatic for lead-acid and nickel-cadmium stationary batteries. The unit varies the charge rate of the rectifier as required by the battery and prevents overcharge or undercharge damage. The key component of the unit is an accurate and sensitive inverse-temperature-compensated voltage relay that senses the battery's state of charge, then cuts in the low rate or high rate as needed. Weight of the control unit is 12 lbs. *Exide Industrial Marketing Div., Electric Storage Battery Co.*

Circle No. 18 on Readers' Service Card

Non-clog submersible pumps

Non-clog submersible pumps are designed to handle large solids and stringy materials, such as industrial wastes, light sludge and slurries. These pumps are equipped with a one-piece cast iron impeller either in two-blade design or in the bladeless impeller design. They come in 2-, 3-, and 4-in. sizes. The enclosed non-ventilated induction motor, available in a range of from ¾ to 7½ hp, has an oil-filled interior and finned exterior for rapid cooling in underwater operation. Installation in any sump or pit requires only one piping connection and a plug-in electrical connection. *Fairbanks-Morse & Co.*

Circle No. 19 on Readers' Service Card

Air-operated back pressure regulators

The new regulators have capacities up to 50,000 lbs. of steam per hr. or 25,000 gpm of water. Sliding gate seats used in both the pilot and main valve give accurate regulation, tight shut-off and minimum maintenance. 4- and 6-in. sliding gate air-operated regulators are suitable for pressures to 250 psi WSP and temperatures to 500° F. The main valve is cast iron with

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125 lb. ASA flanges, or ductile iron with 150 or 300 lb ASA flanges. The pilot is a standard screwed end control valve with special sliding gate seats. *OPW-Jordan Corp.*

Circle No. 20 on Readers' Service Card

Dock leveling equipment

The Adjust-A-Lip Dockboard is said to reduce truck loading time and cut labor costs by 12 per cent. Both shipping and receiving docks can be revamped with the self-contained dockboards. *Kelley Co.*

Circle No. 21 on Readers' Service Card

Continuous mixer

The Shear-Flow continuous mixer is designed to provide shear action in continuous mix operations. It is capable of mixing any liquid that can be pumped. Compact, self-contained, it eliminates large mixing and paddle tanks and lends itself to systems requiring jacketed heating or cooling. The RL Hi-Shear Head can be powered with motors ranging from 1 to 10 hp, depending on the power requirement demanded by the operation. *Gabb Special Products Inc.*

Circle No. 22 on Readers' Service Card

Polyethylene resin for extrusion coating

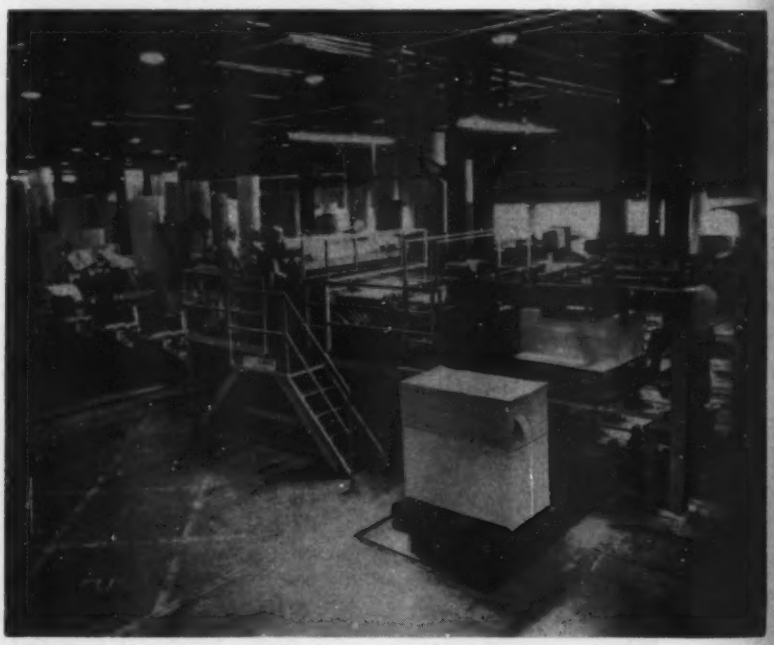
A black pigmented polyethylene resin for extrusion coating onto paper or paperboard, is now available. Known as Petrothene 201-220, it has a 0.916 density, a 4.0 to 5.5 melt index, and has a wide application in mulch-coated paper and packages for photographic film or paper. Coatings greater than 0.75 mil made from the resin provide an effective light and moisture barrier. Low moisture content eliminates need for drying of the resin before extrusion. Electronic treatment of the coating to permit glue adhesion is easily performed on any commercial treating unit. *U.S. Industrial Chemicals Co.*

Circle No. 23 on Readers' Service Card

Chemical proportioning pumps

A new series of small-volume high-pressure chemical proportioning pumps is now available for applications where small volumes of fluid must be handled at pressures to 30,000 psi. A choice of pressures from 7,500 psi to 30,000 psi is offered in either simplex or duplex model pumps; capacities range from 0.84 to 6.44 gal. per hr. *American Instrument Co. Inc.*

Circle No. 24 on Readers' Service Card



Cutter-layboy unit

The Cutter-Layboy Unit features shuttle backstand, accurate cutting and automatic side removal. The backstand eliminates time normally spent for roll loading, therefore minimizing downtime. Twin backstands are mounted on a motor operated carriage permitting one backstand to feed the cutter while the other backstand is being loaded. The cutter frames are of heavy duty construction and sheet length range is controlled through P.I.V. unit. Automatic side removal system discharges platform containing pile and skid to either side of the layboy. *Moore and White Co.*

Circle No. 25 on Readers' Service Card

Continued on page 820

at Valley we make it
our business to develop equipment
to help you **REDUCE YOUR COSTS**

Newly designed Valley Portable Roll Header with electrically heated heads. This mobile unit can "head" rolls at any number of locations, thus saving costly roll handling and moving operations. This is another example of a specially designed and engineered piece of equipment to meet the requirements of a customer and to aid in reducing costs.

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For more data circle 133 on Post Card

NEW PRODUCTS

Continued from page 818

3-way valves

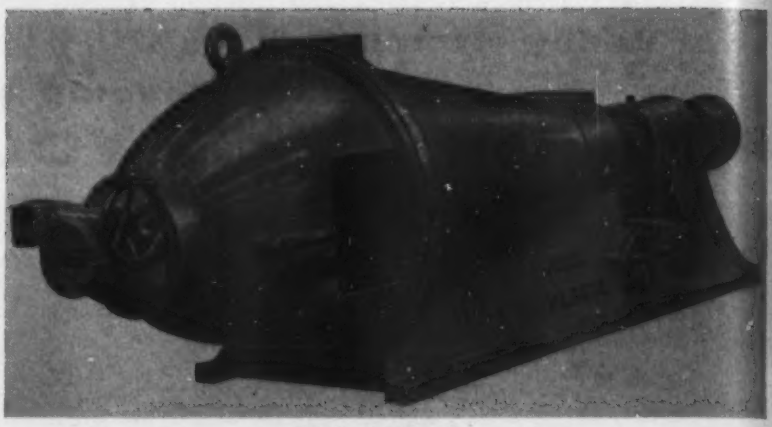
The 3-way micro valves feature: male pipe connections which turn permitting installation without unions, operating pressures up to 100 psi, and fast, positive snap-action. Two or more valves may be easily manifolded together for multiple operation. They are available in a variety of orifice sizes, materials, and types of operators. *Instruments Inc.*

Circle No. 26 on Readers' Service Card

Self-priming portable pump

A canned self-priming portable pump, is self-lubricated and combines the primary features of positive displacement type pumps with the general transfer abilities of centrifugals. Pump and motor are combined in one compact unit that eliminates seals, drive shafts, couplings, packing glands and bases. It handles up to 11 gpm and temperature ranges from 40° to 180° F. It creates heads up to 55 ft. and suction lifts up to 15 ft. It is available in cast iron, bronze or stainless steel. *Corley Co. Inc.*

Circle No. 27 on Readers' Service Card



Majestic Jordan

The Majestic Jordan will process the widest possible variety of stock from fine grades to rough board. Depending on the type of stock being processed, and its ultimate use, Majestic Jordan refining capacity varies from 100 to 250 tons per day. The Majestic employs the same Adapta-Plug, shaft, and Accru-Set Control assembly found in other Jordans, removable as a unit for faster, easier maintenance. *E. D. Jones Corp.*

Circle No. 28 on Readers' Service Card

Dry acid cleaner

Two new dry-type chemical treatments for boiler and process systems; an alkalinity-pH depressant and an acid cleaner, are now available. Both are based on sulfamic acid and have a wide range of application in cleaning boilers, heat exchangers, condensers process vessels and piping. *Ionac Chemical Co.*

Circle No. 29 on Readers' Service Card

Carthage-Norman Chippers Give You Greater Yield of Higher Strength Pulp

With its unique helicoidal disc segments and variable-bevel knives, the Carthage-Norman Chipper produces the highest percentage of "to size" chips. There are fewer compressed or bruised chips and ½% to 1% less sawdust — a feature which can pay for the chipper in one year. Knives wear longer — cost less. Heavy-duty construction results in exceptionally low maintenance costs.

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Books

DESIGN FOR GROWTH, by Dean Richmond, with introduction by Bruce Barton. Published by Baker, Jones, Hausauer, Inc., Buffalo, N.Y. Pages: 142.

This is the story of National Gypsum Co. in commemoration of its 35th anniversary showing the actual application of American progressivism. A comprehensive portrait of National Gypsum, the author received access to confidential company files, questioned executives, and wrote this story of big business. The result is an easy reading, fast-paced, exciting account of a colorful episode in the business and industrial history of this nation.

POLYESTER RESINS, by John R. Lawrence, production manager-plastics, Glidden Co. Published by Reinhold Publishing Corp., New York. Pages: 192. $4.50.

This book is a comprehensive presentation of the booming polyester resin industry. It covers all aspects from historic background, chemistry, curing mechanisms and manufacturing, to techniques used in processing the resins for use in reinforced plastics, casting and coating applications.

Particular emphasis is given to formulating resins for special properties such as weathering and flame resistance. The appendix includes a tabulation of the basic characteristics of the standard resins manufactured by the major resin suppliers together with related reference material.

Booklets

CHARACTERISTICS OF PHOTOGRAPHIC FILMS AND PAPERS. The American Standard Methods for determining the dimensional change characteristics of photographic films and papers have been approved and published for the first time by the American Standards Association. Designated PH1.32-1959, the standard offers three alternative methods of measurement of sample lengths — pin gage method; optical gage method, and the rotating grid method. Copies are available at $1.50 per copy from the American Standards Association, Dept. PR 148, 10 East 40th St., New York 16, N.Y.

OFFICIAL CLASS B PRODUCT LIST AND PRODUCT ASSIGNMENT DIRECTORY, is the title of the revised edition of this publication by the U. S. Dept. of Commerce. The major change in the publication consists of a substantial revision of the code numbers of the various items listed to conform to the latest edition of the Standard Industrial Classification Manual issued by the Bureau of the Budget. The booklet is primarily designed as a guide for industrial mobilization planning, and can be used as directory of product and industry assignment.

USDA Reports

THE FOLLOWING TECHNICAL NOTES may be obtained from the Lake States Forest Experiment Station, U.S. Dept. of Agriculture, at the University of Minnesota, St. Paul 1, Minn.: No. 584, Restoring Swamp Conifers on Brushy Lowland Requires Adequate Brush Control, Large Stock, and Careful Planting; No. 585, Top-Dying of Yellow Birch, Upper Michigan 1955-59; No. 586, Effect of Deer Browsing on a Young Jack Pine Plantation in Northern Lower Michigan.

THE 1959 ANNUAL REPORT of the Lake States Forest Experiment Station, U. S. Dept. of Agriculture Forest Service, St. Paul 1, Minn., can now be obtained. According to this report, timber losses from insects and diseases are now 10 times greater than from fire in the Lake States. For this reason, the 36th Annual Report examines critically the forest protection situation and its related research needs. At the back of the report is an annotated list of the Station's publications for the year.

Manufacturers' Publications

Copies of these publications are available at no obligation through our Readers' Service Department. Use the reply card which accompanies this issue when requesting items.

Alkaline detergent

Oakite Products Inc., has published a service bulletin describing their alkaline cleaner. The bulletin tells of the steam or hot tank application of the cleaner and describes the uses found for it in the lumber industry and paper mills.

Circle No. 30 on Readers' Service Card

Pneumatic conveyors

Young Machinery Co. is making available a revised bulletin describing the complete line of pneumatic conveyors. Bulletin P-259-A describes negative and positive pressure systems, closed circuit systems and a variety of special applications. Included are illustrations of major components utilized in pneumatic systems, a series of diagrammatic sketches showing twelve system

variations, and a number of installation photographs with specific application data.

Circle No. 31 on Readers' Service Card

Economic productivity

Eddy-Rucker-Nickels Co. has published a discussion by Allen W. Rucker on Economic Productivity—The New Growth Factor in Employee Pay Plans. The discussion emphasizes employee earnings and required productivity, based on long-term trends projected to 1964 and 1968 for various major categories.

Circle No. 32 on Readers' Service Card

Steam Temperature control

Bailey Meter Co. is issuing a four-page brochure describing the operation and accurate control of high steam temperatures. Three detailed diagrams explain the operation and control principle of desuperheater water control, and burner tilt and desuperheater water control. Also included are curves showing the effects of steam temperature control.

Circle No. 33 on Readers' Service Card

Temperature regulating devices

American Instrument Co. Inc. is offering an illustrated catalog on temperature regulating devices capable of routinely controlling air or liquid temperatures. The various components described are available separately for incorporation in do-it-yourself installations, or jointly. Bimetal and mercury thermoregulators, heaters, relays, stirrers, pumps, and transformers are included.

Circle No. 34 on Readers' Service Card

High temperature steel pipe and tubing

Babcock & Wilcox Co. is offering a publication on their high temperature tubular products. The six-page folder, designated T-467, contains information on 15 steels widely used in high temperature service. Included is a chart containing data on tensile properties, thermal conductivity and expansion, creep strength, oxidation resistance and other such mechanical and physical properties of importance to application engineers.

Circle No. 35 on Readers' Service Card

Split-body valves

Minneapolis-Honeywell Regulator Co., is offering a bulletin on their split-body control valves. Cylinder actuator construction is illustrated and described in detail. Maximum pressure differentials and mounting dimensions are given also.

Circle No. 36 on Readers' Service Card

Blow pipe

Jacksonville Blow Pipe Co. has published a bulletin on the use of their Blow-Hog in the pulp and paper industry. It features a cross-section and illustrations of the Blow-Hog models available. Also included is a current list of Blow-Hog users.

Circle No. 37 on Readers' Service Card

Precision chippers

Budow Machine & Mfg. Co. Inc. is offering a bulletin describing their precision chipper designed for both round wood and slab chipping. Exact specifications are given according to size and power of the machine.

Circle No. 38 on Readers' Service Card

The story of safety

The National Safety Council has issued its report to the nation for 1960: "Accident Prevention Works". This report demonstrates its title and gives statistics for all fields of safety in the past year. Succinctly, it is the story of safety.

Circle No. 39 on Readers' Service Card

Shaft mounted and flange mounted drives

Falk Corp. is offering a revised bulletin on shaft mounted and flange mounted drives. Design and construction advantages are included as well as selection and dimensional data, engineering drawings, accessories, and typical application photos.

Circle No. 40 on Readers' Service Card

Rust removal

Oakite Products Inc. is offering a bulletin on tested and proved procedures for preventing and removing rust under almost any conditions. The bulletin covers such common industrial problems as safe removal of rust from raw stock by the use of inhibitors or inhibited acid compounds; the prevention of rust between processing operations, and during periods of storage; the washing of parts by machine or tank immersion with simultaneous protection against rust; and anti-rust conditioning of steel in preparation for painting.

Circle No. 41 on Readers' Service Card

Caustic soda booklet

U. S. Industrial Chemicals Co. is offering a 40-page booklet giving complete chemical and physical properties on caustic soda. This new booklet features ten pages of graphs and tables. Special sections are devoted to determining costs of caustic shipments and to a discussion of the best methods of shipping and handling caustic soda. Complete analysis and first aid procedures are also included.

Circle No. 42 on Readers' Service Card

Lever guns

Lincoln Engineering Co. has released a bulletin on their 1142 & 1169 lever guns. The three-way reloading is illustrated, and catalog descriptions of the two models are given.

Circle No. 43 on Readers' Service Card

Rubber products

Manhattan Rubber Division of Raybestos-Manhattan Inc. has issued a revised condensed general catalog describing the company's complete line of rubber products for industry. Included in the 24-page catalog are sections on Poly-V drive, V-belts, transmission belt, conveyor belt, and all types of hose, flexible rubber pipe and expansion joints, plus a summary of molded and extruded products.

Circle No. 44 on Readers' Service Card

Alloy steel castings

Esco Corp. has released a new catalog entitled "Custom Alloy Steel Castings". This catalog contains technical data regarding heat, corrosion, and abrasion resistant alloy steels. Charts listing half of the more than 100 available cast alloys are included, as well as descriptions of services and casting methods.

Circle No. 45 on Readers' Service Card

Surface size

Monsanto Chemical Co. has issued a technical service bulletin describing Scriptite 53, a surface size used to obtain lactic acid resistance and wax holdout on paperboard. Application, mixing procedure, general formulation and actual test results are offered as a guide.

Circle No. 46 on Readers' Service Card

Pulp refiner

Sprout Waldron & Co. Inc. is offering a bulletin on a complete line of pressurized pulp refiners. Approximate dimensions are given for installation use. Included is a four-color cutaway drawing showing the operating principles of the refiner.

Circle No. 47 on Readers' Service Card

COMPLETE SERVICE

- Design
- Construction
- Maintenance

LININGS AND TILE TANKS

STEBBINS ENGINEERING AND MANUFACTURING CO.
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MONTREAL, VANCOUVER

For more data circle 136 on Post Card

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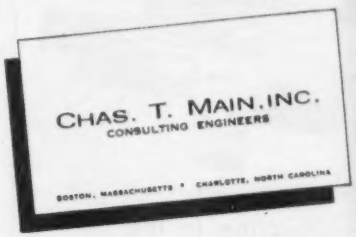

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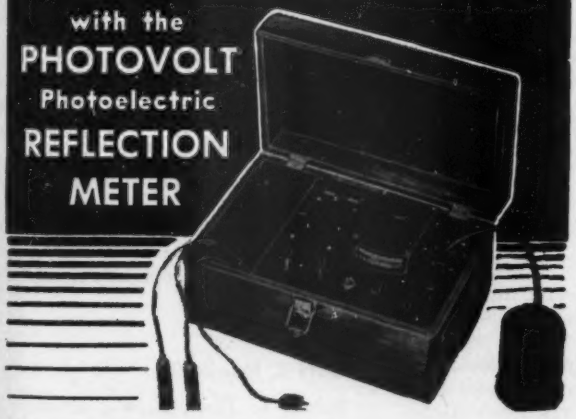

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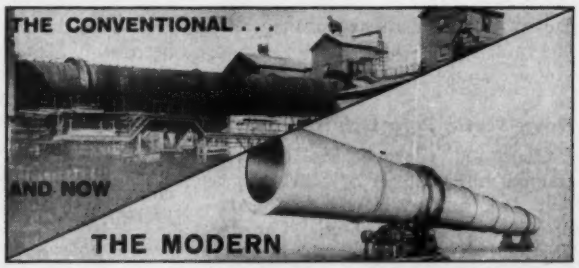

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For more data circle 140 on Post Card

continued from page 806

mill. He formerly was technical director of the Lee mills.

George Lyman, who has been staff quality control engineer, will become quality control coordinator for the entire Schweitzer division. All the above are based at the Peter J. Schweitzer Division of Kimberly-Clark Corp., New York, N.Y.

William H. Clifford, veteran Kimberly-Clark executive, has retired as financial consultant and a director of the company.

International Paper Co.

Burton W. Runkel has been appointed general manager of the Wood Preserving Division of International Paper Co.'s Southern Kraft Division, Mobile, Ala. Runkel was formerly assistant manager of this division.

Robert P. Miller, safety engineer for Long-Bell Division of the company, has been named coordinator of safety and personnel, Western Operations.

O. B. Beyer, manager for the last 25 years of the company's mill at Corinth, New York, Northern Division, has retired.

Judson Hannigan Jr. will replace Beyer as manager of the mill. Hannigan was formerly assistant manager of this mill.

Nova Scotia Pulp Ltd.

Charles H. Claypool has been appointed mill manager of Nova Scotia Pulp Ltd., at Port Hawkesbury, Cape Breton Island, Nova Scotia, Canada. The mill is now under construction and is scheduled for start-up during the first quarter of 1962. Claypool had been manager of the Oxford Miami Division of Oxford Paper Co., West Carrollton, Ohio.

Syracuse University

Dr. Jan J. Hermans, professor of Cellulose Chemistry and Director, Cellulose Research Institute, has been honored by the New York Academy of Science with the award of fellowship status in the academy.

Dr. Vivian T. Stannett, professor of polymer chemistry, Department of Forest Chemistry, has been given the same award. Both are on the staff of Syracuse University, College of Forestry, Syracuse, N.Y.

J. L. Hanchette

R. H. Austin

J. A. Muir

A. J. Kileen

Huyck Felt Co.

Rupert H. Austin Jr., of the Huyck Felt Co., Rensselaer, N.Y., has been promoted from field service engineer to felt sales engineer for Connecticut, Rhode Island, Massachusetts, New Hampshire and Vermont. He replaces Warren Naugler.

John A. Muir has been appointed field service engineer for Ohio, Kentucky, Indiana, Pennsylvania, Tennessee and West Virginia.

Allen J. Killeen has been appointed field service engineer for Colorado, Iowa, Kansas, Missouri, Oklahoma, and portions of Illinois, Indiana and Wisconsin. Killeen has worked as a Huyck research engineer since 1957.

James L. Hanchette has been appointed field service engineer for Connecticut and portions of Massachusetts, New Hampshire and Vermont, for Huyck Felt Co., Rensselaer, N.Y. He is familiar with felt design, manufacture and application and has a broad knowledge of practical papermaking.

American Can Co.

Walter E. Bachman Jr. has been appointed vice president in charge of manufacturing for the Dixie Cup Division of American Can Co., New York, N.Y. Bachman was formerly vice president in charge of the facility planning and control department.

NECROLOGY

Charles R. Van de Carr Jr.

Charles R. Van de Carr Jr. was retired president of Mead Corp. Widely known in the paper industry, he had been with Mead since 1926. Van de Carr had directed installation of the first 1,000-ft. newsprint-making machine in Canada, and was the inventor of the Van de Carr slice used in high-speed newsprint manufacturing machines.

Albert Steindler

Albert Steindler was chairman of the board of the Inlander-Steindler Paper Co., Chicago, Ill. He was co-founder of the Inlander-Steindler Paper Co. in 1887, and founder and president of the Chicago Paper Association. Steindler was considered a dean of the paper distributing industry.

Henry William Freed

Henry William Freed was manager of the timber division of Longview Fibre Co., Longview, Wash. Freed joined the company in 1945 as logging engineer and was promoted to assistant manager and manager of the timber division.

Merwin W. Swenson

Merwin W. Swenson was retiring vice president and general manager of the General Box Co. of Sheboygan, Wis. Active in many civic organizations, he died the day of his retirement.

Lyman L. Mead

Lyman L. Mead was customer service manager at Fonda Container Corp. Lyman was employed at the St. Albans, Vt., plant since 1943, and was highly respected throughout the paper industry.

Robert L. Hoellrich

Robert L. Hoellrich was assistant purchasing agent at the Fitchburg Paper Co., Fitchburg, Mass. In addition to this position, he was a past president of Fitchburg Paper Co. Association.

Glen N. Gordon

Glen N. Gordon was a retired Scott Paper Co. sales executive. Gordon had been with the Scott company for 19 years until his retirement several years ago.

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt.	
No. 1 white shirt cuttings	11.00—	12.00
Soft unbleached muslins	14.50—	15.00
Fancy shirt cuttings	2.00—	3.00
No. 1 percales	5.50—	6.00
No. 1 washables	2.25—	2.50
No. 1 light silesias	6.50—	7.00
No. 1 light prints	3.00—	4.00
Light flannelettes	5.50—	6.00
Cottonades	2.75—	3.25
Blue overall cuttings	5.50—	6.50
Blue cheviots	6.75—	7.25
Canton flannels, bleached	10.50—	11.00
Canton flannels, unbleached	10.50—	11.00
Osnaburg cuttings	9.50—	10.50
Underwear cuts, bleached	14.50—	15.00
Underwear cuts, unbleached	14.50—	15.00
Sun tan khaki cuttings	5.00—	5.50
America linen cuttings	6.75—	7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York.

	per cwt.	
No. 1 roofing (Chicago)	.55—	.60
No. 2 roofing (Chicago)	.40—	.45
Twos and blues, repacked	2.00—	2.25
Thirds and blues, repacked	1.50—	1.75
No. 1 whites, repacked	—	
No. 1 whites miscellaneous	—	
No. 2 whites, repacked	—	
No. 2 whites, miscellaneous	—	

RAGS (Foreign)

(ex dock New York City)

New Rags

	per cwt.	
New dark cuttings	Nominal	
New mixed cuttings		
New light silesias		
Light flannelettes		
Unbleached cuttings		
New white cuttings		
New light oxfords		
New light prints		

Old Rags

	per cwt.	
No. 1 white linens	Nominal	
No. 2 white linens		
No. 3 white linens		
No. 4 white linens		
No. 1 white cottons		
No. 2 white cottons		
No. 3 white cottons		
No. 4 white cottons		
Extra light prints		
Ordinary light prints		
Medium light prints		
Dutch blue cottons		
French blue cottons		
French blue linens		
Checks and blues		
Linsey garments		
Dark cottons		
Old shopperies		

ROPE and BAGGING

F.o.b. and ex dock New York City

Gunny No. 1, domestic	—
Gunny No. 1, foreign	—
No. 1 manila rope, domestic	—
No. 1 manila rope, foreign	—
New burlap cuts (soft)	—
Sisal strings	—
Mixed strings	—

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	85.00—	90.00
No. 1 hard white shavings	70.00—	75.00
No. 1 soft white shavings	45.00—	50.00
Soft white shavings, uncoated	55.00—	60.00
Fly leaf shavings No. 1	17.00—	22.00
Fly leaf, woody, No. 1	17.00—	20.00
Mixed colored shavings	16.00—	18.00
No. 1 books and magazines	13.00—	15.00
Ledger stock, white, No. 1	40.00—	45.00
Ledger stock colored, No. 1 (Midwest ship)	30.00—	32.50
New manila envelope cuttings (free of groundwood)	50.00—	55.00
New manila envelope cuttings (containing groundwood)	40.00—	45.00
Manila tab cards	50.00—	55.00
Colored tab cards	40.00—	42.50
New northern kraft envelope cuttings	50.00—	55.00
Triple sorted kraft, 100%	30.00—	32.50
No. 1 old kraft	22.50—	
White news cuts, No. 1	40.00—	45.00
No. 1 overissue news	15.00—	17.00
Folded news, special	11.00—	12.00
Folded news, ordinary	9.00—	10.00
Old corrugated boxes	15.00—	16.00
New jute corrugated cuts	19.00—	20.00
Mill wrappers	9.00—	11.00
Boxboard cuttings	4.00—	5.00
No. 1 mixed paper	1.00—	6.00

CHEMICALS

F.o.b. New York City

Alum, ammonium Granular, bags, works, cwt.	4.30—	
Lump, drums, works, cwt.	5.05—	
Powdered, drums, works, cwt.	5.20—	
1-Arginine, drums, kilo	90.00—	
Blanc Fixe Direct process, bags, c.l., works, ton	160.00—	
L. c. l., ton	170.00—	
Bleaching Powder, drums, cwt.	—	
Casein, domestic acid precipitated 30-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.56—	
80-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.64—	
China Clay, domestic dry-ground, airfloat, 99% 325-mesh bags, c.l., Georgia works, ton	11.00—	17.00
300-mesh bags, c.l., Georgia works, ton	13.50—	22.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	23.00—	35.00
Chlorine, liquid Tanks, single units, works, freight equaled, cwt.	3.25—	
Glycerine, refined (CP, USP) 99%, drums c. l., delivered lb.	.28⅞—	
Litharge, commercial powdered Barrels, c. l., works, freight equaled lb.	.13¼—	
Rosin, gum, c. l., f.o.b. New York, cwt.		
K, M	16.40—	
N	16.50—	
WG	17.50—	
WW	18.00—	
Rosin, wood, c. l., f.o.b., shipping point, cwt.		
K, M	12.00—	15.25
N	12.35—	15.60
WG	12.55—	15.85
WW	12.85—	16.25
Saltcake, domestic, bulk works, 100% Na_2SO_4 basis ton	28.00—	
Soda Ash Dense, 58%, paper bags, c.l. works, cwt	1.90—	
Light, 58%, paper bags, c.l. works, cwt	1.85—	
Soda, caustic Flake, 76%, drums, c. l. works, freight equalled, cwt	5.20—	
Solid, 76%, drums, c. l. works, cwt.	4.80—	
Sodium Silicate 40°Be, 1:3.2, turbid, drums, c. l., works, cwt.	1.65—	
52°Be, turbid, 1:2.4, drums, c. l., works, cwt.	2.65—	
Starch Pearl, 140-lb. bags, cwt.	6.53—	
Pearl, 100-lb. bags, cwt.	6.38—	
Powdered, 100-lb. paper bags, cwt.	6.58—	
Sulfur, crude Bulk, c. l. mine, contract, long ton	23.50—	
Talc Domestic, fibrous, N. Y., grd., bags, c. l. works, ton	28.00—	
Canadian, ground, bags, c. l. works, ton	20.00—	35.00
Titanium Pigment Calcium-rutile base, regular, bags, c. l., lb.	.09½—	
High-tinting, drums, c. l., lb.	.14½—	
Zinc Oxide Pigment, American process Lead-free, bags, c. l. freight allowed, lb.	.14½—	
Leaded, 35%, bags, c. l., freight allowed, lb.	.15½—	

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	140.00—
Bleached sulfite, Canadian	140.00—
Unbleached sulfite	—
Unbleached sulfite, Canadian	135.00—
Bleached soda	135.00—140.00
Bleached soda, Canadian	135.00—140.00
Kraft, bleached hardwood	135.00—140.00
Kraft, bleached	145.00—150.00
Kraft, bleached southern	135.00—140.00
Kraft, bleached Canadian	150.00—
Kraft, unbleached southern	120.00—
Kraft, unbleached, Far West	125.00—
Kraft, unbleached Canadian eastern	135.00—
Kraft, unbleached Canadian western	120.00—125.00
Kraft, semi-bleached southern	130.00—
Sulfite screenings	—
Sulfate screenings	—

Quotations on imported wood pulp dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite Swedish, freight allowed	140.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	140.00—
Bleached sulfite, Finnish, freight allowed	155.00—
Unbleached sulfite, Swedish, freight allowed	135.00—
Unbleached sulfite, Finnish, freight allowed	135.00—
Kraft, unbleached, Swedish, freight allowed	125.00—
Kraft, unbleached, Finnish, freight allowed	125.00—
Kraft, bleached, Swedish, on dock	157.50—162.50
Kraft, bleached, Norwegian	155.00—

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more):	
Plain chip	
News vat lined chip	
.009 chip, rolls	
Filled news	
Solid news	
White vat lined chip	
Chip tube and can stock	
Single manila lined chip	
Single jute lined chip	
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	
White patent coated .020	
.018	
.016	

Book Paper (f.o.b. Chicago, c.l. skids per cwt):	
No. 1 enamels	20.80
No. 2 enamels	19.80
Machine-coated, 45- to 100-lb.	15.55— 19.00
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	22.25
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	21.10
Rag Content Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	per cwt
100% rag	—
75% "	—
50% "	—
25% "	—
Rag Content Ledger (white, 5000 to 10,000 lb., ream sealed cartons):	
100% rag	—
75% "	—
50% "	—
25% "	—
Sulfite Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	
No. 1	—
No. 2	—
No. 4	—
Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
No. 1	—
No. 2	—
No. 4	—

Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials

Kraft Wrapping — Natural (standard rolls 9- and 15-in. diam.)	per cwt
70-lb. and heavier	9.00
60-lb	9.25
50-lb.	9.50
40-lb.	9.75
35-lb.	10.25
30-lb.	11.00
25-lb.	11.75
20-lb.	12.75
No. 1 Kraft Butcher — Pink	per cwt
40-lb. only	10.50

(Sheets — Plus 50c cwt)

Technical program of the TAPPI meeting

Continued from page 787

2:00 PM — CORRUGATED CONTAINER SESSION III — (Windsor Ball Room) — T. W. Carroll, Owens-Illinois, Chairman.
Theme: "Use of Industrial Engineering Service in Line Organizations"
Continuation of Session II.
1. "Equipment Replacement", By: F. C. Came, Union Bag-Camp Paper Corp.
2. Question and Answer Period.
3. Panel Discussion by Engineering Committee.

2:00 PM — STRUCTURAL FIBROUS MATERIAL SESSION — (Windsor Terrace) — W. H. McPherson, Minnesota & Ontario Paper Co., Chairman.
1. "Rate of Water Vapor Transfer in Wood Fiber Board", By: D. R. Ziegler, Washington State University.
2. "The Application of Hi-Yield Pulping Techniques to Hardwoods & Softwoods for Production of Insulation & Hardwood Stocks", By: L. E. Eberhardt, Bauer Bros. Co. (To be read by W. McNeil).
3. "Creep in Bending of Insulating Fiber Board Roof Deck", By: T. N. Blau, Johns-Manville Research Center.
4. "Fire Testing Procedures", By: R. H. Neisel, Johns-Manville Research Center.
5. "Moisture and Temperature Distribution During Drying of Insulation Board", By: K. O. Johnson, Minnesota & Ontario Paper Co.

2:00 PM — MICROBIOLOGICAL SESSION — (Room B-C) — B. F. Shema, Betz Laboratories Inc., Chairman.
1. "A Biological Binder in Paper Mill Slimes", By: R. A. Apperman, and L. L. Wolfson, Nalco Chemical Co.
2. "Sulfate — Reducing Bacteria — Their Production of Sulfide and Relations to Iron Corrosion", By: R. L. Starkey, Rutgers, State University.
Sulfate reducing bacteria are anaerobes that reduce sulfate to sulfide while growing on diverse organic compounds. They oxidize certain organic acids but not cellulose and derive nitrogen from ammonium, some amino acids and molecular nitrogen. They develop at reactions from pH 5.5 to 9.0 and at both low and high (55°C) temperatures. Some cultures produce spores. They may develop in association with other bacteria to cause staining of paper pulp by iron sulfide and to corrode iron and steel of pipeline, tanks, and pumps. Control of development is effected by germicides, regulation of pH, aeration, and elimination of the supply of organic nutrients of the bacteria.
3. "Nuisance Algae in Water Supplies", By: C. Mervin Palmer, R. A. Taft, Sanitary Engineering Center.
4. "Biological Deterioration of Pulpwood and Wood Chips While in Storage" (Tentative Title) By: R. M. Lindgren, Forest Products Laboratory.

THURSDAY, Feb. 23, 1961

9:00 AM — WATER SESSION — (West Ball Room) — R. J. Baker, Wallace & Tiernan Inc., Chairman.
1. "Combined Cleaning-Thickening — Waste Disposal", By: R. Lawless, Lawless Bros. Inc.
2. "Review of Water Treatment Practices and New Developments", By: O. V. Lindell, Dorr Oliver Inc.

9:00 AM — ADHESIVES SESSION — (Room B-C) — R. C. Brown, U. S. Envelope Co., Chairman.
1. "The Adhesion Machine", By: Miss E. Weizenhoffer & Dr. F. C. Campins, Polymer Industries Inc.
2. "Effect of Viscosity on the Penetration of Adhesives into Paper", By: Miss R. M. K. Cobb, Lowe Paper Co.
3. "Surface Analysis and Adhesion", By: Dr. W. T. M. Johnson, E. I. DuPont de Nemours & Co., Inc.
Whether two films will stick together when placed in contact, depends on the chemical compositions of the first few molecular layers at the film surfaces.
Film surfaces can be analyzed by lightly polishing the surface of the film with potassium bromide powder; the powder becomes contaminated with surface material. This powder is pressed into a disc and the disc is infrared analyzed. This procedure yields the infrared spectrum of the film surface.
Surface analysis can determine the chemical compositions of the surfaces of the films involved in adhesion and also the locus of failure in cases of poor adhesion. It can determine whether adhesion failures are adhesive or cohesive, or are due to contaminant layers.
4. "Factors which Effect Adhesion of Cellulose Fibers in Paper", By: Dr. John W. Swanson, The Institute of Paper Chemistry.

9:00 AM — PACKAGING SESSION — (Windsor Ball Room) — Eugene Kane, Thomas J. Lipton Co., Chairman.
Consideration is being given to a program concerning the rigidity of corrugated containers at high humidity conditions.

9:00 AM — AGRICULTURAL FIBRES SESSION — (Windsor Terrace) — T. F. Clark, U. S. Dept. of Agriculture, Chairman.
1. "Continuous Soda Pulping, Bleaching & Papermaking of Esparto Grass", By: J. N. McGovern & J. Grant, Parsons & Whittemore.
2. "Dimensions of the Fibers of Non-Woody Plant Material in Relation to Their Utilization for the Manufacture of Paper", By: R. E. Perdue Jr., U. S. Dept. of Agriculture.

CURRENT COMMENTS

Continued from page 793

Soundview Pulp Co. of Everett, Wash., for which Scott issued $60,000,000 in stock; the *Detroit Sulphite Pulp & Paper Co.*, acquired with $11,000,000 in stock; and *Hollingsworth & Whitney*, acquired in 1954 for $33,000,000 in stock. The Federal Trade Commission complaint alleges that without these purchases Scott's share of the sanitary paper market would have decreased from 27 per cent of the market instead of increasing to 33 per cent. In issuing the complaint the Federal Trade Commission over-ruled the recommendation of its own hearing examiner that the original complaint be dismissed.

• • •

A large scale invasion of the paper distributing field by a paper manufacturing company is the acquisition by the *Champion Paper & Fibre Co.*, of the *Carpenter Paper Co.* of Nebraska. Champion is to give 1.825 shares of its common stock for each share of the Carpenter company. The amount involved was not made public, but a financial advertisement in the New York newspapers announces the completion of the sale of 135,000 shares of Champion common stock to an unnamed purchaser. This involves about $4,000,000.

On page 733 in our January issue, it was erroneously stated that Weyerhaeuser Company announced price reductions on its Kraft pulp to $135 from the former price of $145 and on bleached sulfite to $130 from the former $135. The correct prices are: bleached kraft reduced from $160 to $150; bleached sulfite reduced from $155 to $140. Corresponding reductions were made in other grades.

• • •

National Research Corp., Cambridge, Mass., has obtained the ownership of all patent and licensing rights, trade marks and equipment used in the production and sale of Vaculite metalized papers. This results from working out a joint agreement with *Champion Paper & Fibre Co.*, Hamilton, Ohio, to terminate its partnership in the operation of *Vaculite Corp.*

Financial report

The turn of the year saw a general upturn in security prices and the paper issues responded almost unanimously to the more optimistic fervor of Wall Street.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	January 10, 1961	December 10, 1960
American Can	36¼	32½
Same Pref	32⅜	31⅛
Celotex	25¾	22
Same Pref	17	17
Certain-Teed	25¾	13½
Champion P & F Co.	29	24⅜
Same Pref	91	88⅛
Chesapeake of Va.	34¼	31½
Container	24⅜	23⅞
Same Pref	91	*92-92
Continental Can	37⅝	32⅛
Same Pref	77½	77¾
Crown Zellerbach	55⅛	49⅜
Same Pref	*90⅜-90¾	90½
Diamond National	36½	25¾
Same Pref	30	29¾
Federal Paperboard	35	33
Same Pref	*22½-23½	22⅛
Fibre Paper Board	29⅛	26
Great Northern	52	46⅛
Hammermill	27½	27⅛
International (New)	33½	———
International (Old)	———	92⅞
Same Pref	*94¼-95¼	94
Kimberly Clark	83½	85¾
KVP Sutherland	31½	28⅝
MacAndrews & Forbes	27¾	26⅛
Masonite	32	29¼
Mead Corp.	37⅛	34⅝
Same Pref	*88-89⅜	86½
Minn. & Ont.	31½	29⅝
Nat Vulc. Fib.	21¾	21
Oxford Paper	27¼	26⅜
Same Pref	*89-90½	90
Rayonier	17¾	17½
Riegel Paper	28⅛	25
St. Regis	36½	32¾
Same Pref	*92-93	91
Scott Paper	87¼	88¾
Same $4 Pref	*88-90	85
Same $3.40 Pref	74½	73½
Sealright	33⅛	32⅛
Standard Packaging	23¼	22⅛
Same $1.60 Pref	*68-68¼	65
Same $1.20 Pref	29⅛	27¼
Same 6% Pref	29¼	28
Union Bag-Camp	35¼	33½
United Bd. & Cart.	22½	22¼
U.S. Gypsum	102	104½
Same Pref	*153-155½	152½
West Va. P. & P.	41¾	37¼
Same Pref	*93-94½	*94-97

New York Stock Exchange — Bonds

	January 10, 1960	December 10 1961
Champion P & F Co. 4½%	110	101¼
Champion P & F Co 3¾%	93	90
Diamond Gardner 4%	92	91¼
Kimberly-Clark 3%	92½	94
Oxford 4¾%	108	100
Scott 3%	112	113⅛

American Stock Exchange — Stocks

Allied Paper	11¼	11
American Writing	29⅛	30¼
Brown Co.	14	13⅛
Puget Sound	21¾	21¼

*Closing Bond and Asked Prices

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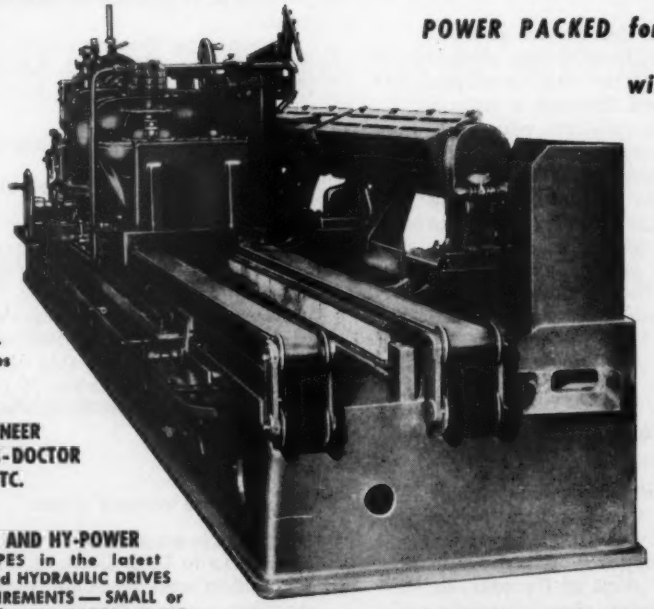

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whither?

in production
processes
new products
markets

New process for manufacturing yarn from paper

A new process, known as the Marks process developed by Enterprize Inc., involves the slitting of a paper roll into ribbons of the desired width. The ribbons are then passed through a trough containing a waxy chemical solution, which imparts some of the desired properties to the yarn, and are converted into yarn on 64 individual spindles. The filled spindles are subsequently removed and mounted on a knitting machine which knits the paper yarn into fabric.

The new knitted paper has proved launderable, giving rise to speculations that it may be used as a permanent textile and reusable paper clothing.

Separation of amylose and amylopectin fractions from dent corn

A production process for separating pure amylose and amylopectin fractions from ordinary dent corn has been developed by A. E. Staley Mfg. Co. A pilot plant for such separation is now in operation at the company's plant at Decatur, Ill.

Starch obtained from ordinary dent corn consists of 75 per cent amylopectin and 25 per cent amylose. The new process will permit the use of these components individually or in any required combination needed for any specific application.

Possible uses for pure amylose, according to Dr. Thomas L. Gresham, the company's vice president for research and development, are transparent films, plastics, coating applications, fibers and filaments.

European pulp capacity increases

Competition facing the U.S. pulp and paper industry in export markets is likely to intensify as a result of some reported increases in pulp production capacities.

Sweden is expected to increase its pulp production by 27 per cent during the 1961-1964 period, while Finland expects an increase of 39 per cent in its wood pulp capacity by the end of 1962.

It may also be assumed that during the 1961-1964 period a large revitalized segment of the U.S.S.R. pulp and paper industry will come into production.

Plastic fourdrinier wires

There are currently 12 installations of plastic fourdrinier wires in the United States, Canada and Europe, according to Charles E. Lee of Huyck Corp.

These wires vary from 24 to 145 ft. in loop size and are used in newsprint, kraft, glassine and groundwood specialties production.

Among their advantages are: (1) corrosion resistance and equalized wear on both sides; (2) the wire's plastic characteristics facilitate a more ready sheet release; (3) wire changes are reduced by 3½ to 4 hrs. with damage during installation reduced to a minimum; (4) a better drainage rate than shown by metal wires, which permits a reduction of the open area by 50 per cent.

Among the disadvantages that still exist are a 2½ to 3 per cent stretch that occurs after installation and a tendency to narrow under load.

Canadian pulp and paper shows record output

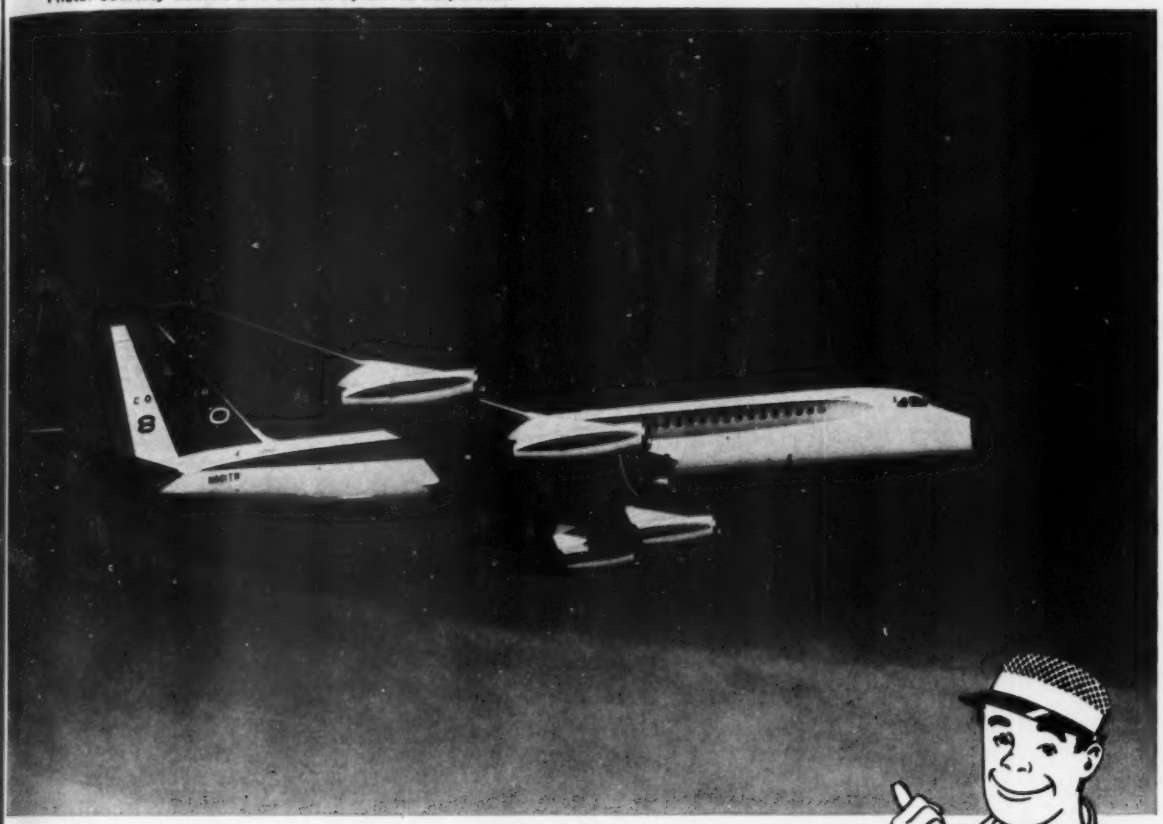
Canadian pulp and paper production in 1960 showed a 5-per-cent increase over the 1959-output, while the industry was operating at somewhat less than full capacity.

Newsprint production also showed an increase of 5 per cent over the 1959-output. The USA absorbed 78 per cent of this output as compared to 80 per cent in 1959, while 15 per cent was shipped overseas as against 13 per cent in 1959.

On-machine coated paper

Output of on-machine coated paper in 1960, according to U. S. Dept. of Commerce, was about 1.9 million tons, or 12 per cent of total paper production compared to 4 per cent of the total production in 1956. Annual output of body stock of off-machine coating remained fairly constant at 275,000 tons during this period. A strong continuing trend toward on-machine coating is thus evident.

*Idea submitted by Donald F. Somes, Simpson Lee Paper Co., Lowell, Washington
Photo: Courtesy Convair Div. General Dynamics Corporation



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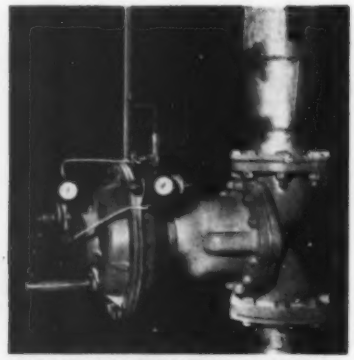
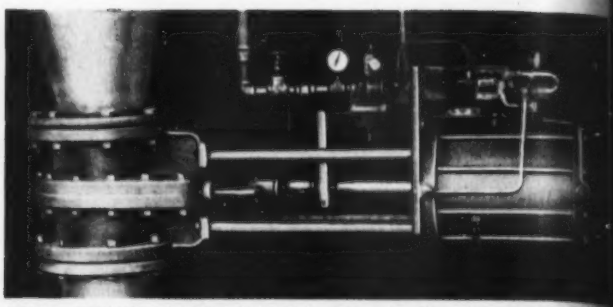
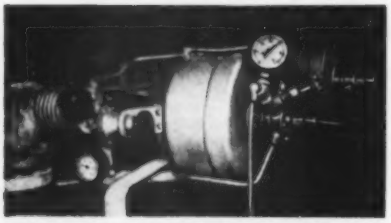


SAUNDERS VALVE (Conoflow close-coupled type) affords automatic throttling control of white water in bleach plant at Marathon Southern's Naheola, Alabama mill. Conoflow is the world's largest producer of Saunders valves for automatic control.



PULP STOCK VALVE (8" Walworth with Conoflow actuator) on automatic control service at Crossett Paper Mills, Crossett, Arkansas. Conoflow actuated pulp stock valves are available in all sizes.



CONTROL VALVES (Conoflow Series LB) on a tough service at the R-W Paper Company plant in Longview, Washington. These 2" single-seated angle valves are handling steam at 700°F. and 600 psi with a 580 lb. pressure drop.

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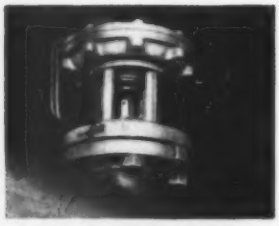
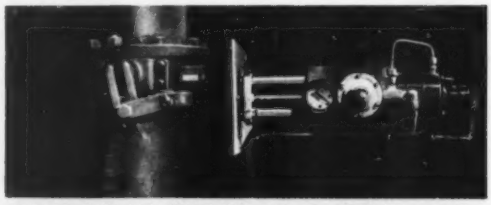
The installations shown here are typical of how Conoflow final control elements have helped bring automation to the pulp and paper industry. Conoflow products make possible faster, more efficient operations, and substantial savings of costly process fluids for many modern paper mills.

VALUABLE DATA FREE! To find out where automatic process control can help you, write for Bulletin MD-1 *Application of Conoflow Equipment in Modern Pulp and Paper Making Processes.* Also ask for reprint *How to Use Standard Pulp Valves for Throttling Control*—a thought-provoking and informative article. Both will be mailed to you promptly, without obligation. Dept. C-901, Conoflow Corporation, 2100 Arch Street, Philadelphia 3, Pa. Conoflow engineering representatives are located in principal cities throughout the world.



PRESSURE TRANSMITTERS (Conoflow Model P) measuring pressure of pulp stock during bleaching process at the P. H. Glatfelter paper plant in Spring Grove, Pa. This is one of several Conoflow Model P's measuring pressure and liquid level at this mill.



BUTTERFLY VALVE (Conoflow actuated) on automatic control service at Crossett Paper Mills, Crossett, Arkansas.

CURRENT CONTROLLERS (Conoflow Model EB) regulating speed of washer thickeners in bleach plant at Marathon Southern mill in Naheola, Alabama. The Model EB is a unique pneumatic-electric transducer—a Conoflow exclusive for the paper industry.

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